THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. VIII. No. 164—11th YEAR.] LONDON, FEBRUARY 1, 1859. [Subscription per Ann. 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

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REPORT ON CROSLEY AND GOLDSMITH'S PATENT METERS.

London, November 17, 1858.

Having been invited by Mr. William Crosley to examine the performance of the gas-meter recently patented by himself and Mr. Goldsmith, and manufactured by the firm of Crosley and Co., of 103, Southwark Bridge Road, we assembled at their manufactory, and now report the result of our examination.

We did not think it necessary to check the accuracy of the testing gasholder employed, as Mr. Barlow had done this on a prior occasion; and he assured us that he had found the index to agree, foot by foot, with a standard cubic foot measure containing 62·321 lbs. of distilled water, at the temperature of 62° of Fahrenheit and a barometric pressure of 30 inches, being the standard of measure established by law. Our first care, therefore, was to so adjust a 20-light experiment-meter that its registration coincided exactly with the index of the testing gasholder, which meter we subsequently used as the standard testing meter in the experiments hereinafter recorded, taking care from time to time to check its accuracy by the gasholder.

The chief novelty in Messrs. Crosley and Goldsmith's meter consists in an ingenious contrivance for maintaining the water at a uniform level, so that the capacity of the measuring-chamber shall not be affected by a deficiency or by an excess of water. It is well known that the registration of ordinary wet gas-meters, and more especially of the smaller sizes, is liable to considerable variation from this cause; and we consequently selected a 3-light meter for our first series of experiments, and commenced by subjecting it to the severest and most unfair test to which any meter can be put—that is, by adding lights till they commence to burn unsteadily. In this manner, a 3-light meter was tested with 10 lights, with the following results:—

EXPERIMENT *No.* 1.—3-*Light Patent Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
10	m. s. 30 23	25·36	25·00	1·44 slow	50·08	6·2

During the course of this experiment we added 10 cubic inches of water, without producing any appreciable effect upon the registration or upon the steadiness of the lights. We then reduced the number of burners to 3.

EXPERIMENT *No.* 2.—3-*Light Patent Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
3	h. m. s. 1 13 5	19·67	20·00	1·67 fast	16·15	1·8

We continued adding water by 5 cubic inches at a time during this experiment, till 20 cubic inches had been added in all, without flooding the syphon or altering the ratio of difference between the two meters; but with 45 cubic inches of water the syphon became flooded, and the lights were extinguished.

Our next experiment was with 1 light, by which means we obtained the results of experiments with the maximum and with the minimum rate of consumption of which this sized meter is capable.

EXPERIMENT *No.* 3.—3-*Light Patent Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
1	m. s. 50 0	4·91	5·00	1·83 fast	5·89	1·1

The extreme range of variation from absolute truth to which the meter is liable, is therefore between 1·44 per cent. slow and 1·83 per cent. fast, till the surplus-water reservoir is exhausted, when the meter becomes an ordinary one; but when it is borne in mind that this reservoir contains 54 cubic inches of water to compensate for evaporation—that some ordinary high-spouted 3-light meters are liable to variations to the extent of 60 per cent., according to the height of the water-line, and that the tolerated variation is 4 per cent at the adjusted water-line—it is evident that the objects aimed at by the inventors have been in a great measure successfully attained.

We continued our experiments by subjecting a 20-light meter to similar trials, commencing with 38 lights.

EXPERIMENT *No.* 4.—20-*Light Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
38	m. s. 8 17	19·94	20·00	0·3 fast	144·4	1·75

We then added water till the syphon became flooded and the lights extinguished, which took place by the addition of 70 cubic inches of water. We then repeated the same experiment with 60 cubic inches of water, added after the overflow-plug had been replaced.

EXPERIMENT *No.* 5.—20-*Light Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
38	m. s. 8 8	19·94	20·00	0·3 fast	147·0	1·75

It will be seen that the registration was not affected by the additional quantity of water; but, being desirous of trying the effect of passing a larger quantity of gas, and there being no means of burning more, we opened a cock leading into a chimney-flue by which the gas could escape.

EXPERIMENT *No.* 6.—20-*Light Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
Not determined	m. s. 6 55	19·99	20·00	0·05 fast	173·4	2·25

It now only remained for us to ascertain the effect produced by reducing the consumption to a low rate; but, as the burning of 20 feet of gas through a single burner would have occupied several hours, we thought our object would be sufficiently accomplished by burning four lights.

EXPERIMENT *No.* 7.—20-*Light Meter.*

Number of Lights supplied.	Duration of the Experiment.	Consumption by Test Meter in Feet.	Consumption by Patent Meter in Feet.	Variation per Cent. in Index of Patent Meter.	Rate of Consumption in Feet per Hour.	Friction of the Meter in Tenths of an Inch of Pressure.
4	h. m. s. 1 6 40	19·87	20·00	0·65 fast	17·8	0·9

The surplus-water reservoir will hold 208 cubic inches of water, available to compensate for the waste by evaporation; and, as the meter will register correctly with a surplus of 60 cubic inches, there is ample provision both for the abstraction of water by evaporation and for an increase by condensation.

We also tested the effect of suddenly opening and closing the gas supply-cock, and found no inconvenience to arise on this head. The flow of gas was steady and uniform, and the pressure was not sensibly affected by the action of the pumping machinery.

Our experiments lead us to the conclusion that the patent meter is a practical and substantial improvement upon the ordinary wet gas-meter, inasmuch as the capacity of the measuring-chamber is not diminished by an excessive supply of water, nor can it be increased by drawing off water. On the one hand, therefore, the consumer is protected against any intentional or negligent overfilling of the meter, the result of which is to exaggerate the registered quantity of gas actually consumed; and, on the other hand, the gas manufacturer is protected against the fraudulent abstraction of water by the consumer, the effect of which in the ordinary meter is to cause it to register less gas than is really supplied. Time alone can determine whether these advantages are gained at the expense of its durability, or by any complexity which may render its utility doubtful; but, so far as we are able to form an opinion upon these points, the patent meters are not liable to any greater derangement than the ordinary wet meters, nor do we believe they will be less durable.

We ought to remark that these meters require to be adjusted and tested after being worked a short time under pressure, in order to give the pumping apparatus sufficient time to raise the water to the proper level in the measuring-chamber. Should this precaution have been neglected, the meter will register rather more than the correct quantity of gas supplied after that level has been attained; and this is an error into which persons who are accustomed to the testing of ordinary wet meters are liable to be led in testing the patent meters.

We have already condemned by implication the practice of transmitting more gas through a meter than it is intended to supply. That quantity is regulated by manufacturers generally upon the basis of 100 revolutions of the measuring-drum per hour, and any increase upon this speed is attended with such diminution in the effective pressure of the gas after it has passed the meter, that our having made experiments at greater speeds must not be taken as an expression of our approval of the system of propelling meters at three or four times their proper speed; on the contrary, we condemn it strongly, as involving an increase in the pressure at which the gas will have to be supplied in the mains, and a consequent augmentation in the leakage.

(Signed)

GEORGE LOWE, *C.E., F.R.S., Engineer-in-Chief to the Chartered Gas Company.*

JOHN KIRKHAM, *C.E., late Engineer-in-Chief of the Imperial Gaslight Company.*

GEDDIE PEARSE, *late Engineer-in-Chief to the Incorporated and Provincial British Gaslight Companies.*

THOMAS G. BARLOW, *Civil and Consulting Gas Engineer.*

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TO CORRESPONDENTS.

A Country Superintendent.—*The removal of pressure from clay retorts by means of an exhauster, or its diminution by the use of pipes and apparatus of large calibre, is the most effectual method of diminishing the deposit of carbonaceous incrustation. When it has been once formed, it must be removed by "scurfing," or burning—an operation which is accomplished slowly by leaving the lid off for several days, and more rapidly by blowing air into the retort, and using the rising pipe as a chimney for creating a thorough current. No chemical agent has any action upon it whatever.*

An Engineer.—*The Bunsen photometer improved by Mr. King, and manufactured by Mr. A. Wright and Mr. W. Crosley. The new edition of Clegg's work on gas is expected in March or April.*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, Feb. 15, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This Journal has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 1, 1859.

NOTES UPON PASSING EVENTS.

Dr. Letheby's principal Report for this season of the year is a very curious commentary upon the intermediate Report to which we referred in our last number; for that gentleman, who then seemed to be so much disheartened by his failures in carrying out immediately his own opinions upon sanitary works as to consider despotic powers necessary for the strengthening of his hands in the labour before him, now admits that there has been of late years a notable diminution in the average rate of mortality in his district. Let us hope that not only the worthy Doctor, but the public in general, will learn from this encouraging result that success in the struggle against disease and suffering depends mainly upon themselves; and that a conscientious discharge of their own duties, and a temperate use of the powers they actually possess, will suffice to secure even a greater practical amount of good than could reasonably be expected when the bulk of the population is relieved from the responsibilities of its own acts. Such, at least, appears to us to be one fair inference to be drawn from Dr. Letheby's latest annual statement; but there are others of a less controvertible nature. Amongst these may fairly be ranked the great improvement which has taken place in the health of the population of the City, in consequence of the works so intelligently carried into effect by Mr. Haywood, upon Dr. Letheby's suggestions. But perhaps the most important lesson to be drawn from the facts recorded in the Report itself is, that, after all, the morals and the habits of the mass of a town population have a much greater influence upon their health than can possibly be produced by any state of the sewerage and water supply, to which Mr. Chadwick and his school alone directed attention. Does not this lead to the inference that our elaborate State institutions for the education of the masses have hitherto failed to perform satisfactorily the functions entrusted to them? and does it not also show that the efforts of philanthropists ought rather to be directed towards elevating the morals and the tastes of the masses, than towards any violent and premature improvement in their physical conditions?

It is one of the most unfortunate circumstances connected with the recent Sanitary discussions, that the leaders of the movement are apparently unable to draw any logical conclusions from the premises before them; and thus it has happened that public attention has been turned from the real objects which it was most important to have considered. Certain theories have been adopted, certain watch-words or verbal formulæ invented to represent them; and when a well-sounding formula of this kind has been once adopted, it has been received by the leaders of the Sanitarians as expressive of a fact—often conscientiously treated as though it were itself a law. Men who act upon such a system are naturally disposed to consider that others who resist the indiscriminate application of the laws thus hastily assumed, are opposed to the application of truth; but they forget that there are many solutions to be given to every question connected with great social problems, and that it is dangerous in the extreme to jump at absolute conclusions, in a science especially, which, by the avowal of one of the most influential Sanitarians, has only been practically studied for ten years. Mr. E. Chadwick, the leader of the men thus referred to, has lately read a paper before the Statistical Society (on the 18th of January, 1859) in which all the defects of the theoreticians he so unfortunately represents are painfully exhibited; and, as the class of documents to which this paper belongs has already produced a serious amount of mischief, it may be worth our while to go a little out of our way to notice the manner in which this particular one illustrates the tendency of the school it belongs to.

Mr. Chadwick, then, commences by stating in substance that the defective social organization of our country entails upon us heavy burthens, in consequence of the waste of capital and labour produced by "competition for the field, instead of competition within the field of service;" and he illustrates this position by reference to the statistics he himself brings forward with respect to Railways, Water Supply, Gas-Works, burials, cabs, omnibuses, boatmen, &c. Now, in the first place, we confess, ourselves, to having no faith in the correctness of Mr. Chadwick's statistics at any time; and we are therefore indisposed to accept the reasoning founded upon them without very severe scrutiny of the statistics themselves. But even if this point be waived, it by no means follows that the conclusions of the paper are justified by the statements given. In the matter of our Railways, for instance, although unquestionably the shareholders receive less average dividends than do the shareholders in the French lines, it by no means follows that our comparatively inferior position ought to be attributed to our principles of legislation and administration

alone, or even in any essential manner. A considerable portion of the cost of the French Railways has, in fact, been paid by the general body of the taxpayers of the country; but we in England hold that the parties who undertake speculations of this kind should bear the whole of its burthen. Again, the interests affected in France are far from being as valuable as are the similar interests here, so that compensations have been heavier in our case; and it must be added that far too many even of our legislators themselves have contributed to swell to an undue extent the amount our Companies have been obliged to pay on this score. But the great fallacy which lies in the comparison Mr. Chadwick thus endeavours to draw, is to be found in the fact that the existing Railways of France are essentially trunk lines, whilst we at home enjoy the advantages of a highly-developed system of cross lines. The receipts of our trunk lines, if compared with the receipts of analogous French ones, would show a far more favourable result than the one exhibited by Mr. Chadwick; but it would be as absurd to infer from that fact that our system of legislation and administration is superior to the one adopted by our neighbours, as it is to assert from the results of the actual working of the railway system in the two countries, as exhibited in the shareholders' dividends, that we are in a worse position than our neighbours in our social organization. Moreover, we boldly assert that all the truth with respect to the positions of the French Railway Companies is not yet known. The commercial crises of late years have forced our Companies, on the contrary, to reveal the true states of their affairs. The tale which future years may reveal may singularly modify the reasonings of the present.

As to Mr. Chadwick's remarks about the water supply of London, the best answer is simply to refer any inquirer to the Report of the Select Committee of the House of Commons on the Metropolis Water Bill 1851. In that Report it will be seen that Mr. Chadwick's calculations as to the saving by the consolidation he proposed then, and now re-suggests, were utterly false; but the best commentary on this particular portion of the attack on our national institutions is to be found in the fact that we actually possess an elaborate system of house supply, whilst nothing of the kind exists in the city of Paris, so often cited by Mr. Chadwick as a model for our imitation. As to the results of the fusion of the Parisian Gas Companies, it is premature yet to pass an opinion. Apparently that operation has hitherto been successful, but the working of a system imposed by abstract theorists, and carried into effect by an extraordinary stretch of the power of the State, cannot be judged by a short and necessarily incomplete experience. It will require some years before the whole bearings of a system so directly in opposition to the ordinarily received opinions on political economy can be ascertained; and, in the meantime, it is certain that the powers of vexatious interference possessed by the municipal authorities have rendered the position of the company very unenviable.

Mr. Chadwick states, though we confess we do not believe his assertion, that the average cost of interments at Paris is not quite £3, whilst in London it is about £14; and he then goes on to say, that *on an estimate* of the expense of the consolidation of the services, he found that a very great saving might be effected. In the first place, averages prove nothing; in the second, estimates often prove less than nothing; for an average is merely the result of an imaginary arithmetical calculation which often has no reference to actual facts, and estimates, such as Mr. Chadwick makes, are notoriously untrustworthy. But even if all that Mr. Chadwick says on the subject were true, we cannot perceive how the execution of his pet scheme for buying up the various Cemetery Companies would affect the price of our London funerals. The fees at the Cemeteries are a very small part of the expense, and Mr. Chadwick's energy would be far better employed in endeavouring to dissuade surviving relations from indulging in the "trappings and the suits of woe," than in a crusade against a body of men who unquestionably came forward at a time when they really were wanted to supply a great municipal want. In the matter of cabs and omnibuses Mr. Chadwick may be learned, since he has become a shareholder and director in the "nursing" company which is striving to establish a monopoly of the public conveyances in the Metropolis; but certainly the results of the working of his own company are far from inspiring confidence in the success of the system he advocates. If the ancient system of competition encouraged ruffianism, racing, &c., can even Mr. Chadwick himself say that the new one his friends have introduced has raised the tone of omnibus morality, or civility?

The fact is, however, that although unquestionably the *laissez aller, laissez faire* system of our country is characterized by a strange mixture of greatness and littleness, and opens the door to very serious evils; and although the system of State guidance unquestionably at times saves the nations which adopt it from pecuniary loss; yet the ultimate results of unrestricted, unprotected, and unguided enterprise are far superior to those which are ever attained by the opposite course. All human institutions have a strange mixture of good and evil: the fabled contest of Ormuzd and Ahriman still rages in the affairs of daily life. But the experience of past ages is before us; and if we read attentively the lessons of history we must see that the nations which have applied the principles of administration (for be it observed that the gist of Mr. Chadwick's paper is to recommend a strong central administration) which characterize the ancient Roman, or the modern French government, or more strikingly still the ancient Egyptian and modern Chinese empires, have invariably sunk into the lowest depths of servitude and misery. Those principles are sure in the end to produce a nation devoid of energy or individual will; submissive, perhaps, so long as it enjoys material prosperity, and has its full allowance of the *panem et circenses* for which it sacrificed its liberties. It will, however, with equal infallibility be found to be utterly unable to cope with the Providential visitations to which empires and private affairs are alike subject; and to be utterly devoid of the power of righting itself which is the most marked and the most noble characteristic of the nations which allow competition to take place both "for and within the field of service." It is curious too—and the fact merits so much more than an incidental remark that we shall return to the subject—that the most important of the "services" Mr. Chadwick refers to, were precisely originated in countries where open competition prevailed, and that absolutely none of the great improvements of the age have been introduced by the nations who are kept in a constant state of minority by their governments. The history of the discovery of steam navigation, railways, gas lighting, docks, sewerage, and water supply, ought alone to have taught Mr. Chadwick and the public in general that, notwithstanding the abuses and weaknesses of our social system, it is one which is, after all, far more favourable to progress—that is to say, to the moral and physical improvement of a nation—than the numbing action of a central administration, even if the latter be for a time able and willing to discharge the arduous task of a visible providence, to guide and protect the actions of its subjects.

These remarks have somewhat turned us from our usual course, but they seemed necessary in the present state of the public mind. Mr. Chadwick, since he has enjoyed the *otium cum dignitate* of the pension given him as a consolation for his being turned out of the office wherein he effected such fearful mischief, has exercised his great energy and talents in diffusing doctrines which, like the dragon's teeth of the fable, may bring forth dangerous enemies to the interests we, as Journalists, advocate. It behoves us to contradict his assertions in time, and not to allow his specious assertions to pass unchallenged; but, as we must also take notice of the progress of Engineering and Sanitary Science, so far as it comes under our observation, we turn now to the statement of the passing events we usually record.

At Richmond, then, as we hinted in our last number, a great effort has been made to secure the application of the Local Government Act, under the direct influence of Mr. Chadwick and Mr. Hassall—what the result will be to the ratepayers, of course, it would be useless here to say; for, unfortunately, it is evident from Mr. Chadwick's last publications that the miserable failure of his engineering fancies has not cured him of the mania for meddling with a science of which he is as profoundly ignorant as he is of law or of political economy, or of his preference for uneducated *practical* men over really "eminent Engineers." Most earnestly, therefore, do we urge the inhabitants of Richmond to examine with their own eyes the results obtained immediately around them, and to ascertain the facts connected with the operations of the new Engineering lights at Croydon and Epsom. Oxford, too, seems tired of its freedom from administrative interference, and it is about to adopt the Local Government Act—a measure of the most dangerous and insidious character, as the inhabitants of the rural districts of Fareham are likely to discover. Richmond and Oxford may, indeed, require the execution of works for the improve-

ment of their sanitary condition; but we urge their ratepayers seriously to weigh the consequences of sacrificing their independence for the trifling advantages presented by the Act of 1858. It is true that, apparently, the powers acquired by the adoption of that Act may dispense with the necessity for the outlay required for obtaining a special one for each case, but those powers can only be so obtained on the condition of accepting the control of the Home Secretary, exercised by the very same officers who brought the Public Health Act of 1848 into such merited contempt. At Fareham the issue raised is a curious one. It relates, indeed, to the principles upon which the boundaries of a district for the purposes of the application of the Public Health Act are to be ascertained, and it furnishes some curious illustrations of the mode in which the system of central administration has been, and is likely to be, applied in our country. The inquiry lately made into this case is so important that we propose to return to its consideration when it shall have been concluded.

Another very curious case was brought before the Court of Queen's Bench on the 27th inst., in which a question of great importance to the owners of water privileges was involved, and which seems to us, as it was reported in the public journals, also to illustrate some of the dangers attending the modern system of arbitration. It was necessary on this occasion to ascertain the quantity of water flowing from a spring, and the arbitrators are stated to have given their decision on this point solely with reference to the short water period of its flow. This quantity was found to be 64 gallons per minute, but subsequently it was ascertained that the average flow was 129 gallons per minute; and the proprietor of the stream now seeks to upset the award based upon the calculation for the exceptional period. Upon the *ex parte* statement of the proprietor, it certainly would appear that he has been the victim of a mistaken view of the question; but of course it would be premature to pass any opinion on the subject in the present state of the case.

In other matters connected with Engineering, or sanitary, improvement we hear of little novelty. The people of Exmouth are said to be about to commence some works for securing a water supply; the Margate Water-Works are also said to be *in train;* and we hear of projects for the water supply of foreign towns which may be arrested by the sad state of political confusion produced by the quarrel between France and Austria. In the meanwhile America is resolutely following the steps of the old world in the great work of municipal improvement; and, amongst the other towns which display this laudable spirit of enterprise, it appears that Washington is disposed to retain its legitimate rank. A very comprehensive water-works scheme has been undertaken for the supply of water to the political capital of the States, and it will shortly be completed—indeed, long before the works for the vaunted supply of Paris by the enlightened central administration Mr. Chadwick admires so much. Madrid has even of late been favoured with an improved water supply; and Lisbon still talks of securing the same blessing. If peace continue, we may then hope still to witness the increase of public happiness throughout the civilized world, so far as it depends on the physical conditions of town populations.

It may interest some of our readers to call their attention to the facilities afforded for some kinds of construction by the introduction of the timber from British Columbia and Vancouver's Island. In a cargo lately imported there is a stick of timber no less than 139 feet long, and 5 feet 3 inches diameter, perfectly straight and sound to all appearances: it would yield a die-square log of 39½ inches on a side. Another fact worthy of notice, which is connected perhaps more with general science than with the subjects usually discussed in this JOURNAL, though it must be of great interest in a country so deeply concerned as is our own in the great industrial operations of the age, is the occurrence of a submarine volcanic eruption at the extremity of the old mole of Leghorn. The possibility of the occurrence of similar phenomena must be taken into serious consideration in laying down electric telegraphs, especially near volcanic districts.

Mr. Austin, of the late General Board of Health, has forwarded to us a letter, which will be found in our correspondence. In reply, we can only at present decline to do as he requests. The assertion we made was founded on the published report, as it appeared in the daily journals; and Mr. Austin should at least have favoured us with an official copy, indicating the portions which he thinks we had misinterpreted, before so coolly asking us to contradict ourselves. If we have erred, we are at all times ready to avow our errors; and nobody is more sensible than we are of the liability of journalists to make mistakes. But we require at least that our errors should be proved; nor can even Mr. Austin pretend that the bare assertions of his short note are sufficient to efface an impression derived from the perusal of a long printed document.

Mr. Toulmin Smith has advertised the second volume of his *Parliamentary Remembrancer*, and most urgently do we beg all persons interested in the development of our legislative and administrative system to support him in his invaluable—though, we fear, hitherto unremunerated—labours.

THE COWARDICE OF PRIVATE ENTERPRISE.

SOME few weeks ago the *Saturday Review* published a very able, and, unfortunately, a very true article reflecting upon the cowardice of public men in cases wherein it was necessary for them to assume a decided position before the public, or wherein they were called upon to exercise their own judgment. Our contemporary bitterly reproached the blind guides, to whom the nation unfortunately trusts its fate, with their tendency to follow, rather than to lead public opinion, and with their lack of moral courage in assuming any distinct or original positions with respect to the great social questions of the day. Unfortunately, the reproaches thus thrown broad cast against our public men are only too well merited; and, as their author suggests, the present race of politicians is indeed both utterly insincere, and devoid of the main elements of true and enduring influence. But whilst thus recording our most energetic adherence to the condemnation uttered against the political characters of the age, we cannot refrain from casting a glance more immediately at home; and as we observe symptoms of the same lack of moral courage in the commercial classes, which is so vehemently urged against the trading politicians, we think that, before casting stones at the latter, it would be but fair for the organs of the various branches of industry to lay bare some of the weaknesses and defects of the class they seek to represent. The lessons thus read to others, may in this manner profit ourselves.

Now, any one who has carefully watched the legislation of late years cannot fail to have observed that its tendency has been to substitute for the local action which characterized our ancient system of government, the action of a powerful and highly centralized Administration; and that, at the same time that local authorities have been deprived of the powers and responsibilities they formerly possessed, those powers and responsibilities have been transferred to newly created functioneers who are practically irresponsible to the parties at least most interested in the proper discharge of their duties. Many of the laws dictated by the spirit thus displayed have been of a nature to interfere vexatiously with the operations of trade and the enjoyment of private rights; whilst the conduct of the subordinate agents of the Central Administration has been far too often corrupt and tyrannical. Public opinion has been carefully and consistently misled upon many subjects intimately connected with the daily wants and the permanent interests of society, by a class of literary adventurers who have written themselves into pay and place by aid of the delusions they themselves originated. All this has been again and again brought before the notice of the parties who are certain ultimately to suffer the most from the application of the false principles it involves. Again and again have efforts been made to rouse attention to the consequences of the false system our legislators had adopted, and to secure something like unanimity or energy in the resistance to its extended application. Such efforts have been, however, met in all cases by so sad an exemplification of calculating selfishness, of short-sighted dread of a contest with enemies—whose main strength, after all, only lies in the weakness of their opponents—that the conviction must be forced upon every philosophical inquirer into these things, that there is quite as much moral cowardice amongst the industrial classes of our community as the *Saturday Review* has shown to exist amongst our politicians.

For if, in order to take an extreme case, we turn to the recent Smoke Nuisance Prevention Acts, we find that, in the Metropolis itself, the purely municipal function of abating a nuisance, assumed to exist, is taken out of the power of municipal authorities, and handed over to a set of governmental agents of the most equivocal description. It is notorious that a bribe discreetly administered to some of these poorly remu-

nerated servants of the Central Administration (and be it observed that we distinctly include the Police in this dangerous and objectionable category), will at any time secure immunity from the attacks of the Government informers under these Acts. It is equally notorious that the prosecutions take place at the public expense, by means of public officers, and before the paid servants of the party prosecuting; and that the appeal provided becomes perfectly illusory. Yet in the face of this monstrous injustice, and after suffering for several years the annoyances and petty tyranny these acts have inflicted, it is impossible to persuade the manufacturers of the Metropolis to combine, in any energetic manner, to compel their representatives in Parliament to bring the question fairly before the public, or before the Legislature. One man is afraid of rousing the enmity of the Police; another hopes that by keeping quiet he may escape notice; another is afraid of being called upon to pay a portion of the expense of the agitation; and so, in consequence of these excuses for the cowardice of the industrial classes, a most dangerous principle is established, and a measure, which might easily be rectified, is allowed to exist in its original deformity.

Then, again, a set of half-educated, imperfectly informed dabblers in science, recruited mainly from the briefless barristers and medical men without practice, have lately raised an alarm upon sanitary matters by exaggerating the importance of some facts, and by the bold assumption of others, whilst they have carefully diverted attention from the legal provisions which already exist for remedying the evils which, alas! all must acknowledge to bear heavily upon the necessitous classes of our extraordinary society. By an adroit use of these means, new places have been formed at the expense of the taxpayers, new Boards and Commissions of the most useless character have been created; and as these Boards and Commissions must seem at least to earn their wages by some action or other, numerous Acts of Parliament have been passed for the purpose of enabling those functioneers to impose their crotchets upon the nation. Amongst the most mischievous fancies of these trading Reformers, may fairly be reckoned the particular one by which they have been led to challenge the correctness of the science of Engineering;—a profession which, without question, must be considered to deal with the principles of physics the most complicated and abstruse, even whilst they are amongst the most certain, of those met with amongst the applied sciences. As it happened that the crude fancies of these men (we allude especially to Mr. Chadwick, Dr. Farr, &c.) were in direct contradiction with the principles of received science, they were naturally opposed by all educated Engineers, and by the Directors of the various private Companies who had executed works of a nature to come within the ken of the new lights. An antipathy was thus raised between the place-hunters on one side, and really eminent Engineers and responsible Companies on the other; for it is impossible for science and quackery, jobbery and honest enterprise, long to remain in proximity to one another without the occurrence of events of a nature to give rise to contests of some description. At a very early stage of the recent sanitary agitation, therefore, the would-be Sanitary Reformers declared war against "eminent Engineers and trading Companies;" and as the Sanitarians unfortunately had the ear of the empirical Reformers of the State, they succeeded in pursuading their congeners that the whole system of our municipal and industrial organization in these matters required alteration. Various Acts of Parliament were from time to time introduced for the purpose of securing this object; but as Sanitary Reformers are wise in their generation, they took care to apply the old rule, "*divide, et impera*;" to effect the end, they sought gradually to secure the means, without arousing too violently a spirit of opposition. Cemetery Companies were attacked by one Bill; Water-Works Companies were attacked by another; whilst Gas Companies were spared in somewhat of the same spirit with which the Cyclops spared Ulysses: Improvement Commissions were set aside by a third Bill; whilst the rights of property were tampered with piecemeal by all. Yet, strange to say, it has been found impossible hitherto to induce the parties thus seriously menaced to combine for their mutual defence. So long as each individual interest has escaped direct attack, it has stood by in selfish indifference to the fate of its neighbours, and has thus tacitly allowed the establishment of principles which are sure in the end to be extended to itself. We speak feelingly in this matter, as Journalists and as men. For years we have striven to bring back the discussion upon sanitary matters to something like scientific principles; we have, to the utmost of our ability, fought the battle of private enterprise against the extension of official jobbery, and that of local self-government against Centralization. Our reward has been a heavy loss of time and money,—just as is the case with our noble friend, Mr. Toulmin Smith,—whilst they who have benefited by our exertions, as far as they have gone, have quietly buttoned their pockets, and laughed at our Quixotism. There is, we therefore fearlessly assert, as much moral cowardice amongst the leaders of private enterprise as there is amongst political performers on the Parliamentary Stage.

If it were not so, would the great Railway, Gas, and Water Companies allow the law of rating for parochial purposes to remain in its present disgraceful state, without at least making a vigorous effort to enlighten public opinion on the subject? If the municipal corporations of the kingdom were not cowards at heart, would they allow the Central Administration to assume the dangerous position of their tutor and guardian? If the Gas and Water Companies really had the courage to defend their own, would they continue quietly to witness the diffusal of false opinions on the matters connected with their interests —opinions, moreover, which must be eventually as injurious to the public as to themselves? The candid reply to these inquiries would, we are convinced, not add to the reputation of the parties concerned, so far as their moral courage is in question; and sure we are that the only mode of grappling with the evils to which the private enterprise of the country is exposed, will be found in a decided reversal of the conduct hitherto followed by its leaders. The careless indifference to the fate of neighbours, fellow-tradesmen, and may-be rivals, in their struggles against the socialist follies of the age,—the temporizing policy of waiting until personally attacked,—and the want of cohesion amongst the industrial classes, make them easy victims of the mischievous parties who now mislead public opinion. Boldness and union would indeed give strength; and truly the interests involved are so great, the whole of society is so directly concerned in their healthy action, that it becomes almost a public necessity to create in some such manner, as we have from time to time suggested, an association for the purpose of watching the course of legislation in matters affecting industry, and of resisting the diffusion of the mischievous theories which have already entailed such heavy burthens upon the ratepayers, who have been foolish enough to put faith in official science. Until an association of this kind is formed, on a solid and permanent base, the industrial classes will be the victims of the class of adventurers we have alluded to so often. Their own want of moral courage provokes and facilitates attack. Even Quixotism for the common good is wiser, and safer too withal, than the culpable waiting upon Providence which has characterized the proceedings of the industrial classes of late years.

Circular to Gas Companies.

We regret to observe that the existing state of the relations of some of the large metropolitan and provincial gas establishments and their workmen is very unsatisfactory, and gives rise to considerable anxiety. The subject was alluded to at the recent meeting of the Commissioners of Sewers, and the spirit of insubordination which it was then stated had manifested itself among the men employed by one company is, we have reason to believe, more or less prevalent among the workmen of nearly all the London gas companies, and has caused a "strike" at one of the Manchester gas-works. It therefore becomes the duty of the directors to adopt vigorous measures to protect themselves and the public from the possible consequences. The peculiar circumstances of the manufacture and the supply of gas, render it more essentially necessary than in other manufactures that there should always be a reliable supply of labour at command, for as the storing power in the winter months does not in any gas-work exceed a day's, and in many of them only half a day's, consumption, a sudden and unexpected cessation from work might cause the most serious inconvenience. Though this peculiar dependence on the continued labour of the men has been constantly manifest, scarcely in any instance have provisions been made against it by binding them to stated periods of service and to give reasonable notice before leaving. In collieries, where such stipulations are made and enforced by legal penalties, a "strike," when it does occur, is of less importance than in the manufacture of gas, because a supply of coal may be collected at the pit's

mouth sufficient to last for half a year's demand; whilst half a day's suspension of labour in a gas-work might throw a whole district in darkness. It is true that the duties of stokers are not such as to require a long apprenticeship, and men previously unaccustomed to the work might, under the instruction and guidance of an energetic foreman, become sufficiently expert in a few days to keep up the required supply, and it is probably a reliance on the easy training of unskilled labour that has made managers less careful than they would have been in the engagements of their men, whilst the latter may have been prevented from taking advantage of their position by the knowledge that their places might be readily supplied. Such restraining, prudent consideration may, however, give way to the excitement of fancied wrongs, or to ill-advised combination to extort higher wages; and the possibility of the metropolis being left in darkness should not be allowed to depend on the mere will of a combination of men.

Whilst we maintain that it is essential for the safe conduct of the works of a gas company that the men should be placed under stringent regulations as to the periods of their service, any legal provision of that kind would be very ineffective in obtaining a proper discharge of the necessary duties unless accompanied by measures of an opposite character. An enforced, discontented service is equally bad for employers as for the employed; and every possible endeavour should be made, by liberal treatment and by proper consideration for their wants and comforts, to raise a spirit of emulation among the men in the performance of their work. We noticed in our last number, as an example worthy of imitation, the arrangements made by the Phœnix Company for the instruction and amusement of their servants, and in another column will be found a letter from an intelligent correspondent—the manager of large gas-work—who, in speaking approvingly of the principle adopted, observes: "I am sure that if the officers and servants of the several companies were treated with more kindness and greater liberality, the business would be conducted in a better spirit, *more economically*, and with greater satisfaction to the proprietors *and to the public*." We fully concur in these sentiments, which we are glad that our correspondent continues to entertain notwithstanding the want of success that has attended his individual efforts to carry his views into effect. It is very discouraging to find endeavours made to benefit and improve are not appreciated, but we cannot believe that the men engaged in gas-works are insensible to kindness if it be exerted in the direction suited to their peculiar condition; and the success which has attended one part of the plans of our correspondent points out the course that should, in the first instance, be pursued. Though the men would not attend the lectures nor read the books he provided for them, and though even the baths have no frequenters, "the *dining-room* is used." Men who have been engaged for many hours in their severe labours as stokers are little disposed to attend to moral improvement or to mental culture. The wants of the body claim their first attention, and food and rest must be obtained before they can be fitted to appreciate lectures or even to enjoy the luxury of a warm bath. Any plan for the improvement of the character of the men must begin with attention to their physical wants, among which the relaxation of longer rest from their labours must be included; and when these are attended to we have little doubt that stokers will be found as desirous as other workmen to take advantage of improving relaxations. The peculiar nature of the operations of a gas-work scarcely permit of an entire cessation from labour on the Sunday, but its diminution to the lowest practicable point is a subject which ought to engage the attention of all whose aim is to advance the moral and social condition of the labouring population of this country; and we shall be at all times ready to open our columns to correspondents who may have any practical suggestions to offer in furtherance of this object.

The Directors of the Chartered Gas Company have circulated a reply to the notable reports of Messrs. Arntz and Hughes on the supply of gas to the public lamps of Westminster, some of the fallacies of which we pointed out on the 7th of December last. The directors have very properly thought fit not to allow the gross charge that their company had imposed on the public to pass unanswered, and they have succeeded in showing, by comparisons of the contradictory statements of Mr. Arntz and of Mr. Hughes, as well as by indisputable facts, that not the least reliance is to be placed on the experiments whereon those gentlemen founded their reports. The methods by which the pressures were taken are shown to be fallacious, and the contrariety of the results—which gave the same quantities of gas delivered at very varying degrees of pressure—was sufficient, one would have thought, to show the experimenters themselves the utter worthlessness of their labours. The unfairness of estimating the general pressure from a few instances is also commented on; nor does the absurdity of endeavouring to ascertain the amount of consumption by comparison with the burners of another company fail to be pointed out by the directors, who have very satisfactorily refuted the calumnies "of the two amateurs who have so recklessly misled a public board, and traduced important public companies." The directors affirm that they are fully prepared to prove incontestibly that they not only perform their contract as to the quantity of gas supplied to each burner, but that they exceed it; and as regards the reports of Messrs. Hughes and Arntz to the contrary, they have completely shown that they are not worth the paper they were printed on.

The remarks contained in our last on the crisis through which the Great Central Gas Company has just passed, will have prepared our readers for the announcement we are now enabled to make of the termination by the company of the contract with Messrs. E. and A. Prior, under which the manufacture of gas has been carried on at their works for the last eighteen months. A notice to this effect was duly served under the provisions of the contract, and acted upon on Saturday last; and the works will be henceforth carried on by the company under their own immediate direction and control. We believe that an amicable arrangement has been come to with the late contractors for the purchase of their stock, and that by the exercise of a prudent forbearance on both sides, the change of management will be effected without the litigation or disputes which rendered the former change so disastrous to the company's prospects. Thus, after nearly ten years of procrastination and abortive attempts to sustain it, the system of manufacturing gas in London by contract has broken down, and the trial of four shilling gas has now fairly commenced.

Communicated Articles.

EXAMINATION OF COALS USED IN PARIS AND IN THE NORTH OF FRANCE.

The following report, by MM. Regnault, De Senarmont, and Pelouze, appeared in the "*Comptes Rendus de l'Académie des Sciences*, No. 19 (10 *Mai*, 1858)." We insert it as a contribution towards the history of the French coal measures; but we cannot say that its conclusions appear to us to have much practical value.

The investigation of the various conditions of combustion in the furnaces of locomotives is the object of the important work which the author proposed to himself, and of which we are about to give an account. This question is composed of very different elements, of which the most important is the combustible; but as, according to whether coke, coal, peat, or wood may be employed, the products of combustion vary, so with them the form and dimensions of the locomotives must also be modified.

The examination of combustibles from the point of view of their chemical composition, and of their principal properties, should precede that of their combustion in locomotives. These are two distinct questions, of which the first is the only one we have to examine. The author, in order to shorten too extensive a subject, has limited himself to the examination of the combustibles which arrive by the Northern Railway; and he did so for the further reason that it was in the furnaces of the locomotives of this railway that the investigations were made.

The combustibles referred to are—

1. The coals of Belgium,
2. The coals of the north of France,
3. The coals of the Newcastle basin,
4. "Briquettes" (a sort of artificial fuel made into blocks),
5. Coke,
6. Peat from the departments of the Pas-de-Calais, the Somme, the Aisne, and the Oise.

The importations of coals from Belgium and England, and those produced in the north of France, amount altogether to about 5,000,000 tons.

In 1856 they were obtained from the different coal basins in the following proportions:—

Mons and the Central Basin	1,700,000 tons
Charleroi Basin	900,000 „
Pas-de-Calais Basin	300,000 „
Newcastle Basin	400,000 „
Valenciennes Basin	800,000 „
Total	5,100,000 tons

The annual consumption of France being nearly 9,000,000 tons,

it follows that the investigations of M. de Marsilly comprehend more than the half of the coals which are used there.

M. de Marsilly, at the commencement of his researches, discovered that the loss of weight which coal experiences in the dry vacuum was always less than that it experienced in the stove at 212°. This observation led him to study the action of heat upon coals between the ordinary temperature and 572°. He states that beginning from 122° the coal lost gas, the disengagement of gas only became appreciable at 212° and upwards, and that it went on increasing up to 626°, and probably up to the point at which decomposition, properly so called, of the coal commences.

The quantity of gas obtained varied from 61 to 122 cubic inches per 2·2 lbs. of coal. Moreover, he obtained a liquid product, having the odour of benzole, the weight of which varied from 154 to 231 grains per 2·2 lbs. of coal. The united weight of the gas and of the liquid constitute the loss which coal experiences up to 576°; it varies from 1 to 2 per cent.

A remarkable fact to be observed is, that coal obtained from fiery mines always disengages gas, and nearly exclusively the carburetted hydrogen; whilst coal obtained from mines free from firedamp does not disengage any trace of the carburetted hydrogen gas, and that which it does give off is composed principally of nitrogen and carbonic acid. Knowing this, the miner, by a simple and practical experiment, can find out if the vein of coal in which he is working for the first time will give off any firedamp. The author carried his researches further into this subject, and attributes the firedamp to a spontaneous disengagement of the carburetted hydrogen in the coal. For this purpose he has rapidly pounded large pieces of coal, which had been raised from the mine only three or four days, and put the powder so obtained in a vessel under a bell-glass. The next day the bell-glass was filled with a gas which caught fire on contact with the flame of a candle. It would thence appear that from this coal firedamp was spontaneously disengaged. This disengagement of inflammable gas also explains the cause of the explosions which have several times taken place in the coal-holds of steam-ships when any one has had the imprudence to descend into them with an uncovered candle. A practical rule to be drawn from this fact would be, that we ought to avoid putting into a steam-ship, or indeed into any closed place, coal recently raised from a fiery mine, or we ought to take precautions against an explosion. The spontaneous disengagement of carburetted hydrogen has taken place even when the pressure of the surrounding air has been five times the atmospheric pressure.

M. de Marsilly demonstrated this as follows:—He put into a cylindrical copper vessel 44 lbs. of coal dust, obtained by rapidly pulverizing the larger pieces of coal freshly raised from the mine; he then hermetically closed the vessel, and with a pressure-pump he compressed the air in the interior until it attained a pressure of five atmospheres; a cock was placed on the upper part of the vessel, which he opened for an instant to allow a small quantity of air to escape, with the object of producing the disengagement of the carburetted hydrogen which had then become liberated: the same cock served afterwards to collect the carburetted hydrogen. At the end of twenty-four hours a gas was collected which caught fire on contact with a candle. The repetition of this very simple experiment gave constantly the same result; and it proves what was said above, that a considerable pressure does not prevent the disengagement of firedamp. On the other hand, the disengagement was so complete after six months, and probably before that time, that even a temperature of 572° did not furnish any additional quantity. We may, therefore, conclude from these observations, that the gases which are disengaged from coal freely exposed to the air, are the same as those obtained on heating the coal to 572°.

The carburetted hydrogen is not the only element which is lost by exposing to the air coals obtained from fiery mines; the fatty principle which facilitates the formation of coke also disappears, if not entirely, at least in part.

Very rich coals that had been exposed to the air for nearly six months only produced in the manufactory an imperfectly formed coke, whilst excellent coke was obtained in the same ovens from fresh coal raised from the same bed.

If there be any analogy between the gaseous products which are disengaged, either spontaneously by exposure to the air, or by the action of heat at a less temperature than 572°, this analogy is not less complete and remarkable between the liquid products. All the rich coals obtained from fiery mines, after they have been submitted to a temperature of 572°, cease to blow and to coke. If they have been reduced to powder before calcination, they remain as a powder afterwards. Thus, there is a disengagement of the fatty principle, either by a long exposure to the air or by the action of heat at a temperature less than 626°. The same sample of rich coal, calcined without having been previously dessicated, gave, as I have just pointed out, a good coke—that is to say, coherent and fit for both domestic and manufacturing purposes.

It was known for a long time that coals, even the least pyritous, exposed to prolonged contact with air and humidity, lose a notable part of their value, for distilling to extract gas for lighting, for making coke, or for burning in a grate for heating purposes. Still, the facts recorded by M. de Marsilly do not give us the key to these phenomena; but we may consider them as one step on the way which will conduct us to the solution.

We are now about to indicate the methods followed by M. de Marsilly in the analysis of the coals. The author himself remarks that, with few exceptions, he has pursued the methods described by M. Regnault in his "*Recherches sur les Combustibles Minéraux.*"

The elements which enter into the composition of coal are—

The hygrometric moisture,
Hydrogen,
Carbon,
Oxygen,
Nitrogen,
Ash.

Besides these we must add coke—that is to say, the residue which coal leaves after distillation in a closed vessel.

The Hygrometric Moisture.

This has been measured by the loss which the powdered coal suffers when exposed in a dry vacuum to the ordinary temperature.

Hydrogen, Carbon, Oxygen.

The dessicated coal is burnt in a current of dry oxygen, and the combustion is finished by making the gas, still carburetted, traverse a bed of oxide of copper, at a red heat. The apparatus employed by M. de Marsilly is composed of—1st. A gasholder full of dry oxygen. 2nd. A tube of very refractory glass, open at both ends, one of which communicates with the gasholder through potash and pumice tubes. 3rd. A U-tube filled with pumice, a Liebig tube, and a proof-tube.

With the different descriptions of coal submitted to analysis, the length of the tube must vary; thus, for coke and poor coal a tube of from 16 to 20 inches suffices; but when we operate upon rich coals with long flames, it is necessary to use a tube 39 inches long.

The tube, having been previously carefully dried, is half filled with warm and recently-calcined oxide of copper.

The coal is placed in a small platinum boat which is introduced into the tube, and rests upon the oxide of copper. This part of the tube is not covered with copper foil, in order that the progress of the operation may be followed, and the completion of the incineration observed. The oxide of copper is made red hot; the oxygen is then made to pass through slowly, and at the same time some pieces of charcoal are put behind the boat, then little by little beneath it, so as to produce a slow and progressive distillation of the coal without letting it catch fire. This precaution is particularly useful with rich coals. The boat is then heated more strongly, and the coal completely burnt. The combustion operates always at the extreme point where the oxygen arrives, and advances progressively. The operation is terminated when no bright spot can be seen in the platinum boat.

This method offers many advantages. Thus, the same tube can be used many times; the ashes are obtained directly and in an exact manner. It has, however, one inconvenience: the nitrogen, which exists in a small proportion in coal, produces nitric acid, which is condensed in the water-tube. From this circumstance, there is a small error in the determination of the hydrogen.

M. de Marsilly endeavoured, by means of per-manganate of potash, to determine the quantity of nitric acid which is condensed in the U-tube, and the corresponding error which results to the hydrogen from this cause. He found that the error was comprised between 0·05 and 0·1 per cent.

Determination of the Nitrogen.

This was determined in general by difference. The exceedingly small proportion of this gas in coal rendered it of small importance for the object which the author proposes; however, M. de Marsilly sometimes determined the quantity of nitrogen by the method of M. Péligot, which he considers the most exact, and at the same time the most expeditious.

Determination of Ash and Coke.

The method used to determine the hydrogen and carbon gives directly, as we have seen, the weight of ash; but M. de Marsilly has always verified the result, by directly burning some of the coal in a platinum crucible, in the muffle of a cupel furnace.

It was in the same muffle that the coal was calcined for the purpose of determining the weight of the coke that it produced. In this case M. de Marsilly used a platinum crucible, covered with a lid, and placed in an earthen crucible also covered; he put some pieces of charcoal between the two to prevent the entrance of air when cooling. He operated generally upon 77 grains of material for the determination of the ash, and also for that of the coke.

In the course of these analyses, M. de Marsilly made an observation of considerable importance; he found that some pieces of coal, which appeared homogeneous to the sight, did not furnish, on combustion, the same quantity of ash in their different parts. The same fact occurred with coke obtained by calcination of fragments from the same block of coal. Therefore we conclude that we ought to reduce the coal to a fine powder, if we desire to discover the real per centage of coke or cinders in the sample.

The second part of M. de Marsilly's paper is devoted to a classification of coals. We give a rapid *résumé*.

He classed the coals by countries and by basins, and in each basin he drew up his classification in accordance with industrial usages and the position of the bed.

In Belgium the general direction of the beds is from the east to the west. In the Mons basin we find to the south rich smiths' coal; the poor coals, more to the south again, are little worked; then, in advancing towards the north, the hard coals, the rich

flénu coals, and the dry *flénu* coals. In the central basin we meet with rich coals in the north; and in the south, coals of middle quality, neither rich nor poor. Finally, in the Charleroi basin we have the two preceding kinds of coal, and quite to the north the poor coal.

The analyses establish that the poor coals have the least hydrogen, oxygen, and nitrogen, and the most carbon. The passage from one class of coal to the other is signalized by an increase of hydrogen, oxygen, and nitrogen, and a diminution of carbon; at the same time the quantity of residue from the calcination in a close vessel diminishes, and the quantity of carbon which passes over in the volatile products increases. The coals of the Valenciennes basin are of the same quality as the Belgian, with the exception of the *flénu*. The analyses establish that both are similar in composition, and the law laid down above applies here also.

The Pas-de-Calais basin is not yet well known. According to the analyses of M. de Marsilly, we meet here with the greater part of the varieties of coal that we find in Belgium, which is a reason for concluding that the beds will present the same varieties of coal, in the same order, in passing from the north towards the south. The identity which exists in the composition of the Belgian and French coals, adds a new reason to those we already have for believing that the coal measures of the north of France are the prolongation of the Belgian coal measures.

If we consider the formation of the poor coal to be more ancient than that of the other varieties of coal, we have in the analyses of M. de Marsilly a confirmation of the law, laid down by M. Regnault, that the passage from the combustibles of an ancient formation, to those of a more recent one, is marked by an augmentation of hydrogen and oxygen, and by a diminution of carbon.

Analyses of English coals appear to show that these coals can be arranged in the classes established for the Belgian and French coals.

Analyses of "Briquettes" show a composition nearly identical between them and the coals from which they were fabricated. This was, of course, a fact to be foreseen.

M. de Marsilly found in the coke intended for the railways, a small proportion of hydrogen and oxygen. Its calorific power is less than that of coal. The author determined by numerous experiments the quantity of water that coke will absorb, either by exposure to humid air or by exposure directly to water; he also has shown the importance, in an industrial point of view, of the determination of the ash which is produced from the coke. Many railway companies introduce into the agreements which they make with their contractors, conditions by which the water which the dry coke contains is deducted. Moreover, the proportion of ash must never exceed 8 per cent.—beyond this limit the coke is refused. For some years the coke-makers have succeeded, by washing the coals they employ, in obtaining a coke only containing 6 to 7 per cent. of ash. These figures have been ascertained by *La Compagnie du Nord*, which subjects to regular trials, for water and for ash, the coke which it employs.

Peat is seldom used except for domestic purposes; M. de Marsilly, however, made analyses of many varieties of this combustible. Like coal, peat underwent a commencement of decomposition at a temperature of 200°; and this decomposition was very decided at 363°. It appears to be advantageous to dry the peat at 200°, but not at a higher temperature; for the gaseous products which are disengaged with the water contain combustible hydrocarbons. The peat of commerce develops half as much heat as coal, and its price is one-half that of coal; under such circumstances, the latter will be always preferred for industrial uses.

The table of analyses which we annex to this report is far from being complete; but it will give an idea of the importance and the extent of the work of which we have given an account. Your reporter received from M. de Marsilly a number of samples of the combustibles which appear in this table. He determined the composition of them and arrived at numerical results which fully confirm those of the author. Your commissioners do not hesitate to declare, that, in their eyes, the work of M. de Marsilly is the most extensive which has appeared upon combustibles. It contains observations full of interest and of practical utility upon the coals of the Paris market and of the north of France, upon coke and upon peat.

TABLE OF THE ANALYSES OF COAL MADE BY M. DE MARSILLY.

	Name of Sample.	Hydrogen.	Carbon.	Oxygen.	Ash.	Coke.	Ash being Deducted. Hydrogen.	Carbon.	Oxygen.	Coke.	Ratio of the Coke to the Carbon.	Calorific Power.	Observations.
Mons.	Escouffiaux	5·49	85·10	7·25	2·16	72·90	5·61	86·98	7·41	72·30	83	7·297	Coke of good quality.
	Nord du Bois de Boussu	5·53	80·55	9·52	4·40	69·15	5·78	84·26	9·96	67·73	80	7·072	Do. do.
	Levant du Flénu	5·22	82·91	10·13	1·74	66·96	5·31	84·38	10·31	66·37	78	6·966	Coke very hard.
	Grand Buisson	5·40	83·40	7·76	3·44	70·10	5·59	86·37	8·04	69·03	79	7·234	Coke of good quality.
	Haut Flénu	5·42	82·95	10·93	0·70	63·58	5·46	83·53	11·01	63·32	75	6·920	Coke very hard.
	Bellevue	4·48	86·58	6·09	3·05	80·58	4·62	89·10	6·28	79·96	89	7·468	Coke of good quality.
Centre.	Mariemont	4·68	87·36	5·68	2·28	81·05	4·79	89·40	5·81	80·60	90	7·338	Coke of good quality, blistered.
	Do.	4·31	88·62	4·77	2·30	83·70	4·41	90·70	4·89	83·31	91	7·375	Good coke, not blistered.
	Do.	4·14	84·76	5·61	5·49	84·66	4·38	89·68	5·94	83·76	93	7·267	Coke only slightly agglutinated
Charleroi.	Trienkaisin No. 6, 10 paumes	4·68	86·47	5·30	3·55	84·43	4·85	89·65	5·50	83·86	93	7·377	Coke of good quality, blistered.
	Beaulet No. 1, Veine des Haies	3·65	90·89	3·98	1·48	91·86	3·70	92·26	4·04	91·74	99	7·358	Bad coke, in powder.
	Sars-les-Moulins	4·25	88·69	5·26	1·80	85·57	4·32	90·32	5·36	85·30	94	7·315	Coke hardly solidified.
P. de Calais. Valenciennes.	Bonne part, veine Toussaint	3·66	90·54	2·70	3·10	93·17	3·78	93·44	2·78	92·95	99	7·493	Coke was not formed.
	La Cave, veine Rosière	4·81	82·98	6·51	5·70	75·42	5·11	88·00	6·89	73·93	84	7·278	Coke blistered.
	Napoléon, veine Périer	5·53	84·84	6·83	2·80	67·75	5·69	87·28	7·03	66·77	76	7·347	Coke of good quality.
	Fosse Réussite	5·03	85·90	6·57	2·50	75·91	5·16	88·10	6·74	76·83	87	7·360	Do. do.
	Bully	5·82	83·34	7·84	3·00	65·09	6·00	85·92	8·08	64·01	74	7·230	Coke blistered.
	Nouix	4·98	86·78	5·84	2·40	77·05	5·10	88·91	5·99	76·48	86	7·365	Coke of good quality.
	Courrières	4·18	82·68	4·54	8·60	87·62	4·57	90·46	4·97	86·45	95	7·396	Coke not formed, in powder.
Coke Agruppe, Mons		0·33	91·30	2·17	6·20	..	0·35	97·33	2·32	..	..	7·039	
Peat Bourdon, 1st quality		6·01	47·69	39·30	7·00	37·85	5·46	51·28	40·26	33·17	64	3·960	

Correspondence.

MR. LAMING'S LAST WORD TO MR. HILLS.

Sir,—Does not Mr. Hills perceive that his time has gone by for presuming on the popular indifference, and that he has now to satisfy reasoners prompted by their own interests to estimate correctly every statement he may put forward in his defence? It would seem he does not, or he would hardly have attempted to sustain his sinking cause by such a wretched figment as his last epistle in your Journal. I can understand his feverish anxiety to escape from the suspicion of having derived his knowledge of my revivified oxide of iron process of purification from the experiments at Westminster; also his seeking in the depositions from Valparaiso for something better than the verdict of the Guildford jury for satisfying the public on that matter; and I am sure that the public will ever give him the full benefit of the smallest tittle of reliable evidence he can adduce in his own favour. But the newly-arrived depositions (so far as he has quoted them), instead of improving, only serve to make his position worse. We are told by them that Laming, in the months of May, June, and July, 1849, purified gas at the Westminster station of the Chartered Company from *ammonia;* at Guildford, Mr. Hills and his brother told us that they did, by actual inspection, discover that the material made use of on that occasion was chloride of calcium; and the new depositions now come to inform us that the company's deputy-superintendent, Mr. Gore, by order of his superior, Mr. Evans, "*took every precaution in his power to prevent*" Mr. Hills making that discovery. Truly, Mr. Hills has been at pains to prove that, however insuperable were Mr. Gore's precautions, both he and his brother found out how to override them! In the next place, imagine, sir, for a moment that your readers have ceased to bear in mind that my other process of purification—namely, that from sulphuretted hydrogen by means of oxide—did not commence at the Westminster works before the 8th of August, when Mr. Gore had left the company's service; they would then understand Mr. Gore's depositions to mean that absolutely "*all* my experiments at Westminster had reference to the extraction of *ammonia*" *only*. Mr. Hills may presume on the probability of such an amount of forgetfulness by third parties, and that he does so presume is plainly indicated by his having written the significant words in *italics*. But the main object of the depositions, as put forward in Mr. Hills' epistle, is not only to show that an effectual barrier was opposed to the indulgence of his curiosity by Mr. Gore's sense of duty, but also to insinuate that he must have been stopped by that gentleman had he made an attempt *to approach the locality of my oxide experiments*. That that obstacle was not very formidable to the Messrs. Hills they themselves have given practical proof, and that it must have been still less so with respect to the *oxide* purification we shall understand if we only bear in mind that Mr. Evans was Mr. Gore's superior officer, and assigned to Mr. Hills (as the latter admitted at Guildford) a place in the immediate vicinity of the oxide purifiers, where he might leisurely attend to his own process with sawdust and water, without any injunction to shut his eyes to what else might be going on under his nose.

And on "such evidence as this, the most incredulous" are expected to acknowledge themselves satisfied that Mr. Hills and his brother, though now pretending to have been at that time familiar with the oxide process, did not detect in the reddened pavement around them, or in the charging and discharging of purifiers, any evidence of its presence! But I should have "coupled" the said evidence with its being "against common sense to suppose that Mr. Laming and Mr. Evans would have let him (Mr. Hills) know what they were doing, when they intended to take a patent for it

themselves." *Let!* Did Mr. Hills wait for Mr. Gore to *let* him acquire the knowledge of my ammonia purifying? Has he never read a fable in which a fox was *let* to acquire what a lion and a bear meant to have had each all to himself at the end of their disputation, and what they might have divided between them had they compromised in time? Mr. Hills knows that Laming and Evans did not compromise until 1850, whereas his temporary blindness in the vicinity of Laming's invention in operation occurred in 1849. RICHARD LAMING, M.R.C.S.

Hayward's Heath, Jan. 24, 1859.

GAS-METER TESTING.

SIR,—I see in your last number a communication from a "Lancashire Gas Manager" respecting gas-meter testing. Having had some twelve years' experience in the manufacture of gas-meters, permit me to give you my ideas on this interesting subject. What your correspondent says is perfectly correct, that a meter that works with a loss of pressure of 6-10ths at one time, and 1-10th at another, cannot give a correct registration under both circumstances. I do not, however, agree with your correspondent that a gasholder is the best test, but I think that a proper test-meter ought to be used. I would propose to make a test-meter with a drum to hold 5 feet, and on the axle would fix a pointer or hand to indicate on a dial of about 20 inches diameter. The dial should be divided into 100 parts, so that one division would be just 1 per cent. of the contents of the drum. The drum being large would not be easily affected by the pressure; that is to say, any number of lights from 1 to 20 would not interfere with the correct registration. We have for many years used such a meter to control our gasholder, and have found it of the greatest use where we are obliged to deliver our meters within *one* per cent. of the truth. The fact is, from all I have read of late, I plainly see that, like all matters of measurement, we do it better here than it appears to be done in my native land.

A PARIS METER-MAKER AND LANCASHIRE MAN.

Paris, Jan. 22, 1859.

[The writer of the above is perhaps not aware that, in addition to the ordinary test by gasholders, meters are tested in several English manufactories by a test-meter, the drum of which discharges 1 cubic foot at each revolution, and upon the axle of which the pointer is fixed—the index being divided first into 100 parts, and each one hundredth part being subdivided into 4 parts, so that the quantity of gas discharged may be measured to the four hundredth part of a cubic foot.—ED. J. G. L.]

SOCIAL IMPROVEMENT OF THE OPERATIVES IN GAS-WORKS.

SIR,—I am pleased to find, from a paragraph in your JOURNAL of the 18th inst., that the directors of the Phœnix Gas Company "have paid *great* attention to the condition of their workmen," and I hope that part of the "example worthy of imitation" will be followed by the directors of all the other gas companies, for I am sure that if the officers and servants of the several companies were treated with more kindness and greater liberality, the business would be conducted in a better spirit, *more* economically, and with greater satisfaction to the proprietors *and to the public*.

As I have made, unsuccessfully, some similar efforts to those mentioned in your article, I hope my friend Hunter will give a fair and candid statement of the progress of his improvements at the expiration of three months, and, in the meantime, I will give you an outline of "my experience."

Some years since, I fitted up a small room on the works, in which the curate of the district delivered a lecture every week; but the men were so little inclined to profit by it, that we rarely had more than three or four present. Since then improving lectures, but not of a religious character, have been freely given in a schoolroom closely adjoining, with nearly the same result.

After the failure of my first effort, I endeavoured to get the men together for mutual instruction—fitted up another room, and gave them £12 to purchase books for reading, which, I am sorry to say, was received with no better disposition, and ultimately discontinued altogether.

I have now on the premises hot and cold baths, and although the company provide all the men with soap, the baths are never used, and the washing-troughs, also supplied with hot and cold water, very rarely. The "dining-room" is used.

The only part of "the example" which I think can be followed beneficially is that with reference to a reduction or cessation of the Sunday work; and when any arrangement can be made to carry out such an object as this, I will take care that the men employed on these works shall not long be without it; but I must confess that I cannot see how it is to be done except by the introduction of an entire new set of men for Sunday *only*, which I fear it would be difficult to get in the winter.

I enclose my card for your satisfaction, but have no desire to appear before your readers in any other capacity than that of

London, Jan. 25, 1859. NEMO.

THE MANCHESTER GAS-METERS.

SIR,—In your JOURNAL of the 18th instant you intimate that our firm has objected to make meters for the Manchester Corporation with low spouts. In this you are entirely mistaken, as our objection applied to other, then prescribed, arrangements of the mechanism of the meters, with which we thought we could not comply without occasioning injurious consequences to the useful operations of the instrument. So far from objecting to make low-spouted meters for our customers, we may mention that we are now manufacturing them to the dead water-line for works in which Mr. Hawksley is interested; and that the hitherto hurtful result of the sudden undulation to which the water in the meter is sometimes subjected has been prevented in these meters by the adoption of a very simple contrivance.

So far as we are concerned, we prefer to manufacture the improved low-spouted meters, and shall supply them whenever and wherever ordered. WILLIAM PARKINSON AND CO.

(*Successors to Samuel Crosley*).

Gas and Water Meter Manufactory,
Cottage Lane, City Road, London, E.C., Jan. 28, 1859.

THE EPIDEMIC AT WINDSOR.

SIR,—In the comments contained in the JOURNAL OF GAS LIGHTING of the 4th inst., on my recent report on the state of the drainage of Windsor, I find it observed that "Mr. Austin tells a sad tale of the errors of omission and commission of Captain Vetch." I beg you will state in the next number of the JOURNAL that there is no truth in this assertion.

The errors committed in the Windsor works are clearly defined in the report as appertaining to the house and private drains. No complaint whatever is made of the separate Castle works executed under the direction of Captain Vetch, nor of the town sewers carried out under Mr. Roe. No such complaint would have been justified.

I will take this opportunity of adding, that your statements as to the control of the Windsor drainage by the late General Board of Health are equally unfounded. The plans of the Windsor drainage never came before the General Board at all, nor had that Board any control whatever over the execution of the works.

HENRY AUSTIN.

8, *Richmond Terrace, Whitehall, Jan.* 24, 1859.

Register of New Patents.

1500.—JOSIAH GEORGE JENNINGS, of Holland Street, Blackfriars, and THOMAS CULPIN, of 25, Royal Hill, Greenwich, for "*Improvements in apparatus for measuring, regulating, and preventing waste when supplying fluids.*" Patent dated July 3, 1858.

This invention has for its object improvements in apparatus for measuring, regulating, and preventing waste when supplying fluids. For these purposes a cylindrical or other suitable form of vessel is used, which is mounted on axes, on one of which is formed the plug of the supply-cock, which is so formed that the inclining of the vessel first in one direction and then in the other causes the direction of the flow of water to be reversed; and the plug or valve is so formed that it will not quite close the passage, by which there will be a constant flow, even when the vessel is changing its direction of motion. In large apparatus provision is made to prevent a shock in bringing the vessel to rest when it changes its position. Within the vessel there is a weighted piston moving fluid-tight by preference, by the aid of cupped leathers where a cylinder is employed, but in some cases flexible diaphragms are used. The weighted piston moves on a piston-rod which works fluid-tight through the ends of the vessel, which is most conveniently arranged by having flexible discs fixed to the ends of the rod and to the ends of the vessel. The piston-rod is of such length that when one end is protruding the other end is flush with the end of the vessel, and there are projections fixed near the ends of the piston-rod by which, when the piston comes against the collar at either end, it moves the piston-rod and causes it to be withdrawn from the other end and protruded at the end nearest that where the weighted piston has arrived, by which the opposite end of the rod is withdrawn from a catch or detent, and the protruding end is retained by another catch or detent when the vessel completes its motion. In order to prevent waste in the supply of fluid a cylinder or barrel is used, the supply is introduced at one end which is covered with a valve, and the outlet-passage is beyond such valve, and to the valve-stem is affixed a piston, by preference with a cupped leather or other cupped material. In the cylinder is a bucket on a rod. The valve-rod or spindle is formed with a narrow passage, which has a piece of wire passing through, but not filling the passage; the end of the wire is fixed on the end of the bucket-rod; by this means the passage through the valve-spindle is constantly kept open and clear, as the valve-spindle in its movement slides on the wire, and the movement of the bucket-rod also moves the wire through the spindle. Between the upper and lower end of the cylinder or barrel is a tube, by which the water which passes through the bucket in its descent is forced back into the main; when the bucket-rod is moved, the pressure of the water supply will move the valve, and the water will flow to the outlet, till, by the passage of water or fluid through the valve-spindle, the space between the piston and bucket becomes full of water or fluid, when the pressure of water or fluid between the piston and bucket will close the valve. For some purposes the piston-rod and piston thereon are dispensed with, and a small water passage is made between the barrel and the outlet, in which passage there is a cock or valve, which is acted on by a ball-cock or otherwise.

1248.—THOMAS SCHOLEFIELD, of Paris, gas-meter manufacturer, for "*Improvements in gas-meters.*" Patent dated June 3, 1858.

These improvements relate to the class of gas-meters called wet gas-meters, and more particularly to the kind known as the ordinary wet consumers' meters, in which the true measure of the water in the measuring-drum is

kept up by means of a water-lifting or compensating apparatus, actuated by the drum-shaft. They consist, first, in making use in the interior of the meter of a bell with hydraulic seal as the float which works the valve by which the gas is admitted, and also the upper part of the syphon or pipe. The said seal replaces the upper part of the division-plate which in ordinary meters separates the cylindrical compartment containing the drum and measured gas from the front box in which is the unmeasured gas. Secondly, in a special form or shape given to the outside casing of the meter, with the object of simplifying the manufacture thereof, being made in a cylindrical form, the interior of which is partially divided into two principal parts by means of a segmental division-plate, the back division containing the measuring-drum and the lower part of the front division forming the supply, waste-water, and condensation-trough, and containing, further, the receiver and remainder of the working parts of the meter. Thirdly, a special arrangement for working the water-lifting scoop made use of in compensating meters, which arrangement consists of a bell-crank lever.

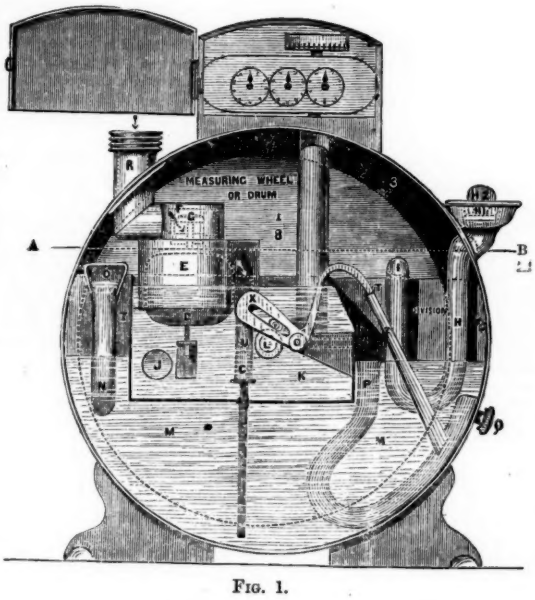

FIG. 1.

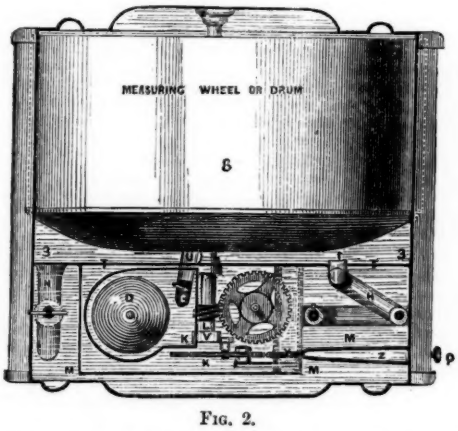

FIG. 2.

Figure 1 represents a front elevation view of the meter with the front plates of the casing and receiver removed, and figure 2 a horizontal section of the meter taken over the line A B of figure 1. In both figures corresponding parts are indicated by the same letters or figures. In figure 1 various parts are represented partly cut away, in order better to show their construction, and make the interior arrangements and working of the meter more comprehensible. The meter consists of a cylindrical casing or envelope of cast or sheet iron, or other suitable metal or material. A segmental cross or division-plate, T, divides the casing into two divisions, the back division containing the measuring-drum, 8, whereas in the front division, the lower part of which forms a trough, M, for the supply, waste, and condensation, is situated the receiver, K, and the remainder of the interior working parts of the meter, thus doing away entirely with the separate boxes attached to other compensating meters. R is the entrance-pipe for the gas, and is connected with and may be made to form part of the valve-box or chamber, F, to the under part of which is securely soldered the bell, E, made of any metal, such as lead or tin, not liable to corrosion. The lower end of this bell is sealed by the water in the receiver, K. A hole or valve, G, serves to admit the gas from the valve-box to the interior of the bell. Under the bell is a float, D, and the upper end of the syphon or spout, C. The float works a valve, G, in the ordinary manner, shutting off the gas should the water become too low. A receiver, K, is fixed to the division-plate, and is in free communication with the back division, 3, containing the drum, 8, by the hole, J, and the opening through which passes the bent arm, U, of the syphon or spout, C. The syphon or spout, C, is constructed in the usual manner, having its bent arm, U, passing into the hood of the drum, 8. Attached also to its lower end is a pipe, S, which passing through the bottom of the receiver, K (to which it is soldered water-tight), descends nearly to the bottom of the trough, M. Z is a scoop or gutter, closed at its extremity, and fixed to the bent arm, Y, of the bell-crank lever, X 2 Y, having its fulcrum at 2, in a bracket fixed to the side of the receiver. The other arm of this lever (which it is preferred should be made of copper, and covered with enamel) is provided with a longitudinal slot which works the pin of a crank, V, fixed on and revolving with the drum-shaft. The whole of the parts submitted to friction are constantly covered with water, and consequently are not liable to set fast when at rest. N is a bent tube, soldered at its lower end to the division-plate, T, and communicating with the water contained in the back division, and serves to regulate the water therein. Screwed into its upper part is a small pipe, O, which can be raised or lowered by means of a key passing through a hole pierced in the case or envelope, and which is afterwards soldered up. By these arrangements the meter can be tested and regulated in a finished state. P is a bent pipe serving to regulate the level of the water in the trough, M, and communicating with the outside of the meter at the screw-plug, Q. The upper end of the pipe, P, is placed so that the level of the water in the trough, M, shall be below the bent arm of the syphon-pipe, C, which is in communication with the trough, M, by the pipe, S. This disposition allows the trough, M, to receive any liquid from condensation. H is another bent pipe, having its end, I, projecting over the division-plate, T (or, if required, can be conducted over the side of the receiver, K), and the other or upper end leading to the outside of the meter, and having attached to it a small funnel, H, closed by a thumb-plug, H^3. This pipe, H, serves to conduct the water into the meter; and the funnel is more convenient for introducing it than the means generally used. The pipes, P and H, are bent so as to contain water, and prevent the gas passing, should the plugs, Q and H^2, not be replaced by negligence. W is a plug to vent the meter when being watered.

The working of the above-described arrangement is as follows. The meter having been placed in working position in the ordinary manner, and the plugs, H^3, Q, and W, withdrawn, water is poured into the funnel, H, and is conducted by the bent pipe, H, into the back division. As it rises it will flow through the hole, J, into the receiver, K, and at the same time up the regulating-pipe, N, until it reaches the level of the top of the pipe, O. This being the correct level of the measuring compartment of the meter, any surplus will flow into the trough, M, until it reaches the top of the pipe, P, and runs out at the plug, Q, which will indicate that sufficient water is in the meter. The plugs, H^3, Q, and W, being replaced, the meter is ready for the admittance of gas, or is in working order. Gas being now allowed to enter at the pipe, R, the same will pass through the opening or valve, G, into the bell, E, the valve being lifted up as in ordinary meters by the float, D. From this bell the gas passes in the usual manner by means of the syphon-pipe or spout, C, into the measuring-drum, leaving by the ordinary exit-pipe. The revolving of the drum causes the crank, V, to give to the bell-crank lever, X^2Y, a reciprocating up-and-down motion, by which the scoop, Z, will alternately dip into the trough, M, and being raised, the water contained therein drops into the receiver, K. This receiver being in free communication with the back division, the same level will be kept up, and any surplus returned over the pipe, O, into the trough, M. The object of the pipe, S, is to clean the syphon-pipe, C, of any condensation, without permitting the unmeasured gas mixing with the measured, as its lower end is always sealed by the water contained in the bottom of the trough, M. Should any attempt be made to introduce into the meter more than the proper quantity of water, it will rise in the trough, M, and also in the syphon-pipe, C, and thus shut off the gas before the measurement can be deranged.

The advantages obtained over other compensating meters by this construction are:—

1. Economy in manufacture, the whole of the outer covering being made in a cylindrical form; the lower part of the front division serving as a supply, waste-water, and condensation-trough, and thus avoiding the necessity of attaching separate reservoirs and boxes, as are generally used for these purposes.

2. Security to gas companies. There being no unmeasured gas in contact with the outer casing of the meter, there is less liability to fraud; and the unmeasured gas being under an incorrodible bell, cannot pass from the meter without being registered.

3. Simplicity of construction, and consequently less liability to derangement.

4. Working the scoop by a bell-crank lever, water cannot be raised from the supply-trough situated below the bent arm of the syphon-pipe.

The claims are for—

1. The general combination of the various parts of the above-described arrangement.

2. Giving to the interior casing or envelope of compensating consumers' meters a cylindrical form, closed at the ends, in order that the lower part of the front division may serve as a trough for the purpose hereinbefore described.

3. The placing the trough for the supply, waste water, and condensation below the bent arm of the syphon or spout.

4. The application of an incorrodible bell, with hydraulic seal covering the float and syphon-pipe, for the purposes hereinbefore described.

5. The working of the water-lifting scoop by means of a bell-crank lever.

1504.—JOSIAH GEORGE JENNINGS, of Holland Street, Blackfriars, and JAMES LOVEGROVE, of Victoria Park Road, for "*Improvements in water-closets and in apparatus used in ventilating house drains or sewers.*" Patent dated July 3, 1858.

This invention has for its object improvements in water-closets and in apparatus used in ventilating house drains or sewers. For these purposes, in constructing stone or earthenware basins for water-closets, the basin is formed with a conical outlet, which is made water-tight by a flexible ring. This hollow plug is made of such a length as to retain the water in the

basin to a proper level, and any addition of water flows off through the hollow plug, it forming an overflow-pipe as well as a plug. The plug is fitted with an ordinary closet-handle, and when lifted liberates the contents of the pan into the ordinary syphon-trap. At other times the plug is to remain in position during any determined time, the object being to save water from sinks, waste-pipes, or other sources where the supply of water may be limited. In order to ventilate house drains and sewers, an air-valve is combined with the ordinary syphon-trap and outlet-valve, the valve being metal-faced. The agent or motive power of ventilation being the variation in the temperature of the atmosphere, and the water discharged into and flowing through the drains or sewers.

1534.—Pierre François Demoulin and Joseph Cotelle, of Paris, for "*Improvements in treating the heavy oils obtained from the distillation of coals, schists, and other hydro-carbons.*" Patent dated July 3, 1858.

In order to defecate the above-mentioned tarry heavy oils, so as to make them serviceable for lighting purposes, and prevent the annoying smell and smoke they give rise to, they are subjected to the following treatment:—

About 220 lbs. of the said oils are introduced into a vessel which can be properly closed, and ultimately is mixed with them about 11 gallons of water, 2 lbs. 3 oz. of chloride of lime, 4 lbs. 6 oz. of carbonate of soda, and about 1 lb. 2 oz. of peroxide of manganese. The entire is then violently shaken, say for about an hour, more or less, and is then left to settle for about twenty-four hours, after which the supernatant oil is decanted from the sediment and distilled in any suitable distilling apparatus, so as to bring the oil to a specific gravity of about 90° to 92° of Vignie's areometer, after which it is submitted to rectification by mixing with about 220 lbs. of the oil about 55 lbs. of resin oil. By this latter operation the oil is deprived of its gummy parts and is at the same time entirely deodorized, and this the patentees consider as the most essential part of their invention.

1537.—Richard Smith, of the firm of Earl, Smith, and Co., of Hallamshire Works, Pond Street, Sheffield, for "*An improved adjustable pipe-tongs.*" Patent dated July 8, 1858.

This invention consists in so constructing the adjustable tongs that the strain consequent upon the use of the tongs shall not separate the jaws by slipping or moving the pivot fixed to the one jaw in the slot of the other jaw. Those parts of the hooked and of the straight jaws by which the pipe is grasped are made in the usual well-known manner. The pivot which holds the tongs together is secured in the straight jaw-piece so that they can turn on each other, and is provided with a collar, which is partly recessed into the inner side of this jaw-piece. The inner side of the hooked jaw-piece rests against this collar, and that part of the pivot passing through the slot is flattened to fit the slot, and to prevent its turning round therein. Now, instead of having the two outer surfaces of the tongs parallel with each other at that place where the pivot holds them together, and securing them with the common nut and washer, the outer surface of the hooked jaw-piece is furnished with an inclined plane, likewise slotted, which may either form a part of, or be fixed to the jaw-piece. This inclined plane inclines towards the hooked end, and the washer fitting upon it is tapered to correspond with the inclined plane, so that the outer surface of the washer is at right angles with the axis of the pivot. A projection on the under side of the washer fits into the groove, and prevents the washer from turning. That part of the pivot projecting beyond the washer is screwed in the usual manner to receive the nut by which the tongs are held together. It will be obvious that any strain which tends to move the pivot in the slot so as to increase the distance between the jaw-hook and the pivot, would have to move the inclined plane of the washer up the inclined plane of the jaw-piece, which cannot be done without breaking the pivot, or stripping off the nut by direct tensile strain.

The claim is for the combination of an inclined plane or planes, or the equivalent thereof, with the slotted jaw, for the purpose described.

1540.—Richard Jex Crickmer, of the Borough Road, London, mechanical engineer, for "*Improvements in treating the sewerage of London and neighbourhood.*" Provisional protection only obtained. Dated July 8, 1858.

This invention consists in separating the more solid from the liquid portions of the London sewerage, and in running off the liquid portions down through the blue clay and sand into the water strata of the great London basin, well known to geologists, as hereafter described. The inventor proposes to block up all outlet from the sewers and drains into the Thames, and form at convenient places below the sewers pits for the reception and temporary retention of the more solid parts of the sewerage. He causes the solid portions to be precipitated therein, if necessary, by lime or other chemical agent, and apply or not any deodorizing matter. Beyond these pits he forms horizontal filters, through which the liquid will pass, if necessary, by pressure or suction, and will enter a second precipitating pit, in which any remaining heavy portions held in the liquid may be precipitated; or, instead of entering this liquid pit, he passes the liquid directly into a shaft extending downwards into the water strata of the great London basin. In this shaft is to be fitted cylinders or plates, to keep out the surface and spring waters, and provide the same or some of them with valves, cocks, or sluices, for the purpose hereafter named. At some feet above the water level in the London basin is placed in the shaft pebbles or other filtering medium, if found necessary, and adopt any suitable means of cleansing the same from time to time. For the purpose of cleansing this shaft the valves or sluices before alluded to are opened, and the shaft scoured with the surface waters.

1541.—Robert George Cecil Fane, of Upper Brook Street, London, esquire, for "*Improvements in treating sewerage, and in apparatus to be employed therein.*" Patent dated July 8, 1858.

This invention consists in constructing intercepting wells beneath sewers and drains, placing in such wells receiving vessels perforated on the sides and at the bottom, which vessels are intended to receive the sewerage matter, and in erecting a stop-bridge in the sewer on the further side of each well; in providing a passage upwards from each well through the said bridge; and in providing suitable openings from the surface of the earth to the sewer, capable of being closed or sealed, through which to get at, remove and replace, the receiving vessels. Filtering, deodorizing, or disinfecting agents may be employed in the wells, and otherwise; but as these form no part of the invention, it is not necessary more particularly to allude to them.

Sewerage flowing down drains and sewers will fall into the receiving vessels, from which the liquid portions will escape through the perforations, and rising through earth, charcoal, or other filtering and purifying agents or not, as actual experience may prove to be desirable, will again flow into the drain or sewer through the passage in the stop-bridge. The more solid matters will remain in the receiving vessels, which, when full, will be raised up through the openings above the drain or sewer. Before being taken directly out from the openings, it is recommended that they should be allowed to rest upon a grating, or other contrivance provided for the purpose in the openings, there thoroughly to drain, fresh vessels being placed at the bottom of the well to receive the sewerage matter. Every well would thus require three receiving vessels, one at the bottom of the well, one in the opening to drain, and a third to replace that at the bottom of the well, which would be raised up when full in order to drain, while that which had drained would be removed in cars into the country.

The specification states at length the *modus operandi* of changing and draining the vessels, &c.; and the claim is for the construction of the intercepting wells beneath the sewers, the perforated vessels contained in them and intended for the reception of the sewerage, the erection of a stop-bridge across the sewer on the lower side of each well, and the openings through which the perforated vessels may be removed, emptied, and replaced.

1557.—Percy Burrell, of 2, Middle Scotland Yard, for "*Improvements in ventilating sewers and other receptacles of sewerage.*" Provisional protection only obtained. Dated July 10, 1858.

For the purpose of this invention, pipes are laid along the lines of sewers or other receptacles of sewerage, and by preference just above them. At intervals connexions of small diameter are made, between the interior of the sewers and the pipes. The pipes are arranged in connexion with suitable apparatus for withdrawing the air and gases from the pipes, which apparatus by preference consists of vessels similarly constructed to gasometers, which are moved up and down by suitable power. The object to be accomplished is the withdrawal of the gases evolved from the sewerage, and constantly to keep the sewers in such a condition that the outer atmosphere will have a tendency to flow into the sewers in place of the gases which, in consequence of internal pressure in the sewers, will have a tendency to pass into the outer atmosphere, as is not now the case. The gases thus withdrawn may by the apparatus be forced through water with such chemicals therein as will arrest the valuable products in the gases, or they may be subjected to fire, so as to decompose them.

1565.—Nathan Defries, of 5, Fitzroy Square, London, consulting gas engineer, for "*Improvements in apparatus for measuring gas.*" Patent dated July 12, 1858.

This invention has for its object improvements in the apparatus for measuring gas. For this purpose, in order to keep up the water to a constant level in a gas-meter, there is a vessel containing an additional supply of water fixed to the meter, from which there is a descending pipe with a covering-valve, in like manner to an oil vessel of a lamp, to facilitate the filling and refixing of the water-supply vessel to the gas-meter; but such valve is open when the vessel is fixed to the meter, and the meter is in use. The pipe of the water-supply vessel descends into a water-chamber in connexion with the meter in such a manner that the water in the meter and the water in the chamber will at all times stand at a like level. In the event of the water in the meter and in the water-chamber connected therewith evaporating, or otherwise falling below the proper level, water will be allowed to descend from the vessel containing the additional supply, by reason of provision being made for the passage of air from the outer atmosphere into such water-vessel, when the water falls too low; but the flow of air from the atmosphere into the additional water-supply vessel is shut off as soon as the proper water-level is obtained in the meter.

1570.—James Alfred Fussell, of Birmingham, manufacturer, for "*A new or improved method of ornamenting chandeliers, pendants, and brackets, for gas and other lamps, which method of ornamenting is also applicable to curtain bands.*" Patent dated July 13, 1858.

This invention consists in applying small mirrors or pieces of looking-glass to those parts of chandeliers, pendants, and brackets, for gas and other lamps and curtain bands, which it is thought desirable to ornament, the said mirrors being inserted and fixed in a framing formed in the article, and defended at the back so as to prevent injury to the silvered surfaces.

1577.—Robert Wilson, of No. 9, and Albert Horwood, of No. 8, Salisbury Mews, Great Quebec Street, Marylebone Road, London, for "*An improved pipe joint.*" Provisional protection only obtained. Dated July 13, 1858.

This invention refers to pipes of a circular or nearly circular form, and may be employed for metal pipe or tubing, or for water-hose or other piping. The object is to make a secure joint and give a certain amount of elasticity. For this purpose a length of india-rubber or other elastic tubing is employed, into which is inserted the ends of the two pipes to be joined. On the outside of the elastic tubing one, two, or more metal clips of clasps are placed and screwed with one or more set screws or bolts so as to press the elastic tubing around the pipes. The clips may be made of circular form or in halves with lips, and screwed together or secured by means of a spring.

When more than one clip is used for the joint, the elastic tubing is protected or strengthened, if required, by a coil of wire, either inside or outside, or both ways, or by strands or hoops, or straight wires or pieces of metal.

1584.—James Jones, of the City Water-Works, Oxford, engineer, for "*Improvements in meters for measuring liquids.*" Patent dated July 14, 1858.

This invention consists in so arranging meters for measuring liquids that the valve by which the flow of the liquid to and from the measuring chambers is governed, is caused to move by the reaction of the pressure of the liquid within either of the chambers when it is completely filled, or

by suitable instruments in connexion with the valve. For this purpose the meter is constructed in the following manner:—One measuring chamber consists of a metal case of any suitable shape, and the other of a flexible bag contained within the case. The liquid to be measured is by the valve let alternately into the case exterior of the bag, and into the interior of the bag itself, or a cylinder divided into two parts by a piston may be employed. The passages to these chambers are in connexion with a valve-box of a cylindrical or other suitable form, containing a valve, which has a double piston or two pistons on the same rod, with a space between the two. Into this space the liquid from the inlet-pipe flows, and, according to the position of the double piston in the valve-box, the liquid passes on into one or the other of the measuring chambers. The valve-box also contains two other pistons, one on each side of the double piston, and these are connected together by a rod which passes through the rod connecting together the two parts of the double piston, this rod being made hollow for the purpose. Passing from each of the measuring chambers, there is a pipe, and these two pipes communicate with the spaces at the ends of the valve-box behind the outer pistons, and when the liquid has filled either of the measuring chambers, it passes back by the tube in connexion with the chamber into one or other end of the valve-box, and moves by its pressure the two exterior pistons in one or the other direction. These at first move independently of the double piston or valve, but ultimately one of the pistons comes in contact with it, and pushes it over so as to reverse the flow of the liquid. The rod of the exterior piston passes through the end of the valve-box, and is connected with apparatus similar to what is called a tumbling bob, which, when the pistons have passed over a little more than half their stroke, tends to carry them rapidly to the end of it. This apparatus secures a rapid change in the position of the valve, and holds it securely in its position until the next movement. Motion is communicated to the counting apparatus from the rod of the two exterior pistons in any ordinary manner.

The patentee does not make a claim to any of the parts separately, nor does he confine himself to the details, but what he claims is the combination above described.

1598.—Alfred Hope Johnson Bastable, of Belgrave Works, Ranelagh, Pimlico, London, for "*Improvements in apparatus employed in the production of light.*" Provisional protection only obtained. Dated July 15, 1858.

Heretofore a powerful light has been produced by throwing a jet of ignited gas, ordinarily a mixture of oxygen and hydrogen, on to a cylinder of suitable material, usually lime, to which slow motion has been given by clock-work, so that the surface presented to the jet is constantly being changed. This cylinder of lime or other material, in consequence of the great heat to which it is exposed, frequently breaks, and falls away from the jet. Now, this invention consists in protecting the cylinder of lime or other material by means of a metal or other suitable tube or case. The cylinder projects upwards above the end of the tube or case, and the jet is arranged to strike the portion of the cylinder so exposed a short distance above the end of the tube or case. This arrangement will be found to prevent in a great measure the cracking of the material, and even when cracks are produced it prevents the cylinder falling in pieces, so that the light is not disturbed.

It is not essential to this invention that the lime or other material should be of a cylindrical form, so long as it is protected by the case as above described. For example, in some cases the material is moulded or formed to the shape of a wheel or disc, and when in use is protected by plates of metal or other material placed on each side of it. These plates are made slightly smaller in diameter than the wheel or disc, so as to expose a portion of its edge all round, and on to this edge the jet is thrown. The wheel or disc is caused to revolve by means of clock-work, so that every portion of its edge may in turn be submitted to the jet.

1616.—Richard Archibald Brooman, of 166, Fleet Street, London, for "*Improvements in apparatus for the reception of fœcal and sewerage matters, and in the treatment of fœcal matters.*" A communication. Provisional protection only obtained. Dated July 17, 1858.

This invention consists in fixing an outflow-pipe, leading to a drain or sewer or other outlet, in or near the upper part of a barrel or vessel, intended for the reception of fœcal and sewerage matters; in causing the precipitation therein of all solid matters; and in preparing such sewerage matters for manure.

An empty barrel or reservoir is filled with lime-water, or water with muriate or other soluble salt of lime, and placed in the required situation. The barrel is closed at the top, and the outside tubes leading the matters into and the liquid from it are packed and luted. The matters and liquids entering the barrel become decomposed under the action of the lime, and the heavy and solid matters are precipitated, and as they enter they drive out an equal quantity of water from the overflow-pipe. Easy separation of the solid from the liquid substance will be obtained, and the precipitated matters being covered with water do not ferment, and consequently emit no bad odours.

To treat these matters so as to be employed as manure, they are extracted from the barrels or reservoirs, and having added quick lime and a salt of lime, preference being given to sulphate of lime recently converted byb aking into plaster, they are stirred until thoroughly mixed. This prepared substance is made into blocks in an ordinary brick machine, and then dried and reduced to powder, which may be used as manure, or fresh stuff from the barrels or reservoirs may be mixed with it, to obtain a manure of the richness desired.

1635.—John Cartwright Hill, of Kentish Town, London, for "*Improvements in making joints for connecting-pipes and other articles by means of lead or other soft metal.*" Patent dated July 20, 1858.

To join two lead pipes together according to this invention, they are scraped clean and their ends inserted into a collar or short piece of lead pipe of larger diameter. This collar is then subjected to the action of a compressing tool, which consists of a cylindrical iron case or box, which confines the collar while an iron punch or collar is forced into one end of the case by a lever, screw, or screws, or otherwise, so as to compress the leaden collar and force it into close contact with the two pipes. The compressing tool is then removed, and the joint is made. The compressing tool may be made to take to pieces, to facilitate its removal. Joints may thus be made when the pipes are full of water or other liquid, and even when the water is exposed to pressure and is squirting out at the junction. In some cases, or when an excessive pressure is to be applied, a short piece of iron or other pipe may be placed within the two pipes to be jointed, so as to support them while the joint is being made; and if it be required to preserve the full water-way in the pipe, the ends of the pipe may be enlarged for the reception of this short piece of pipe. Iron and other pipes may be jointed in a similar manner by applying a collar or short tube of lead or tin, or other compressible metal, over the junction, and compressing it with a compressing tool. A shorter piece of iron pipe may be placed under the lead collar, if desired.

1639.—Richard Archibald Brooman, of 166, Fleet Street, London, patent agent, for "*Improvements in movable apparatus for receiving fecal and sewerage matters.*" A communication. Provisional protection only obtained. Dated July 20, 1858.

This invention consists in the employment and construction of vessels for the reception of fecal and sewerage matters, in which the solid matters are retained while the liquid portions only are allowed to flow into the drains and sewers.

The apparatus consists of a cask or vessel, in the side of which is a screw plug or stopper, protected on the inside of the vessel with a rose wire gauze or perforated plate; a cover is luted or cemented on to the vessel; an outflow-pipe is caused to enter the side of the cover, and to extend down into the vessel for a short distance, where it terminates in a rose or box formed of perforated plate or wire gauze.

When placed for use the vessel is filled with water sufficiently to enable the outflow-pipe to act; then upon any solid or liquid matters entering through the inlet-pipe, liquid will flow through the rose and outflow-pipe into a drain, sewer, or other outlet, while the solid matters will be retained, either upon the surface of the liquid in the vessel or upon the bottom of the vessel. The apparatus will continue to work until the rose or perforated box becomes clogged by the solid matters; the screw stopper must next be removed from the side of the vessel, when the liquid contents will run out into a drain or otherwise, leaving only solid matters in the vessel. The apparatus has to be removed to be emptied of its solid contents, and another similar apparatus put down to supply its place.

1650.—James Meacock, of Snow Hill, London, gas-meter maker, for "*Improvements in wet gas-meters.*" Provisional protection only obtained. Dated July 21, 1858.

These improvements consist in fitting a tube to the valve-box in wet meters, which leads directly into the spout from whence the gas enters the drum and wheel of the meter; in fitting the float at the back of the drum; and in attaching a double valve or stop to the spindle of the float, or to a spindle connected by a lever or levers to the float. Upon any attempt being made to tamper with the meter, by tilting it upwards or downwards, the float would either rise or fall, and stop the outlet-pipe by bringing one or other of the valves or stops into action.

1664.—William Parsons, of Pratt Street, Old Lambeth, London, manufacturing engineer, for "*Improvements in separating the solid matter from sewerage waters.*" Provisional protection only obtained. Dated July 23, 1858.

The sewerage is raised by pumps to such a height as to obtain a considerable head, and from this elevation the sewerage is conducted by pipes into bags of woven fabric, which are protected by cases of perforated metal to enable them to sustain the pressure. The fluid parts of the sewerage pass through the bags, and the solid parts are retained by them. When one of these bags becomes full of solid matter, it is removed and replaced by another, and the full bag is tied up at its mouth, and the matter which it contains may be sold as a manure in the bag in which it is originally collected.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

17.—James Harris, of Hanwell, Middlesex, engineer, for "*Improvements in apparatus for regulating the pressure and flow of steam, water, and other fluids.*" Jan. 1, 1859.

55.—George Kennedy Geyelin, civil engineer, of London, for "*Regulating gas-burners, which he calls the 'Universal Gas-Burner Regulator.'*" Jan. 7, 1859.

77.—John White, of Finchley, Middlesex, surgeon, for "*Improvements in cleansing or purifying air, and in increasing or reducing the temperature thereof, and in the application of air so treated to sanitary and other uses.*" Jan. 10, 1859.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

2119.—Léon de Pariente, of Paris, gentleman, for "*Improvements in apparatus to be applied to gas-burners, with the object of increasing the lighting power of the gas flame.*" A communication. Sept. 21, 1858.

2120.—Jean Clément Emile Malvezin, of Paris, gentleman, for "*Improvements in the manufacture of tubes, pipes, or mains for conducting liquids or gas, or for other other similar purposes.*"

2137.—Alfred Fauvin Jalourеau, of Paris, manufacturer, for "*Improvements in the manufacture of pipes.*" Sept. 23, 1858.

2900.—James MacKenzie, manager to William Strode, St. Martin's-le-Grand, gas engineer, for "*Improvements in those gas-burners known as ventilating sun-burners.*" Dec. 18, 1858.

2936.—John Whitlaw, of Dunfermline, N.B., ironfounder, for "*Improvements in sewerage and drainage apparatus.*" Dec. 23, 1858.

LIST OF PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2249.—Perceval Moses Parsons, "*Certain improvements in connecting and securing the joints of pipes and tubes.*" Oct. 9, 1855.

2347.—Henry Giller, "*An improvement in globes and shades for gas and other lights.*" Oct. 19, 1855.

2460.—George Davis, "*Improvements in apparatus for letting in or shutting off water or other liquids.*" Nov. 3, 1855.

2476.—Francis Hawkes, the elder, "*Improvements in the construction and arrangement of water-closet apparatus.*" Nov. 5, 1855.

2489.—Frederic Ludewig Hahn Danchell, "*Certain improvements in apparatus for ascertaining the pressure of steam, air, water, or any other fluid or liquid.*" Nov. 6, 1855.

2578.—William Lea, "*An improvement or improvements in taps or cocks.*" Nov. 15, 1855.

2640.—Thomas Tuckey, "*Modes of construction by which steam or other vapour or gas may be used as a source of motive power for some purposes more conveniently than hitherto, and more suitable for locomotion on common roads.*" Nov. 23, 1855.

2654.—Hiram Hyde, "*Improvements in the manufacture of mineral oils.*" Nov. 24, 1855.

2786.—Richard Archibald Brooman, "*Improvements in manufacturing gas from peat, and in treating hydrogen gas in order to render it illuminating.*" Dec. 10, 1855.

2788.—Josiah George Jennings, "*Improvements in connecting earthenware rain-pipes and soil-pipes of water-closets, and in valve water-closets.*" Dec. 10, 1855.

2812.—Thomas Rickett, "*Improvements in pressure gauges.*" Dec. 12, 1855.

2880.—Dundas Smith Porteous, "*Regulating the pressure of gas, steam, water, or other fluids.*" Dec. 20, 1855.

2908.—David Dick, "*A new and improved regulator for gas.*" Dec. 22, 1855.

Legal Intelligence.

COURT OF QUEEN'S BENCH.

Westminster, Wednesday, January 26.

(*Sittings in Banco, before Lord* Campbell *and Justices* Wightman, Crompton, *and* Hill.)

THE QUEEN *v.* THE BURSLEM BOARD OF HEALTH.

This case came before the court upon a demurrer to a return to a *mandamus*. The *mandamus* commanded the Burslem Board of Health to make compensation to the prosecutor, Hans Ringlaud, out of a general or special rate for damages alleged to have been sustained by him by the exercise of the powers of the defendants' Acts. The return, in substance, alleged that the defendants did not dispute, and never had disputed, their liability to make compensation. To this return the prosecutor demurred.

Mr. Lush, Q.C. (with whom was Mr. Beasley), supported the demurrer, and contended that the question now raised by the return had already been decided by the court when they made the rule absolute for the *mandamus*. The defendants could not now say they had not disputed their liability, any more than they could say there had been no demand or refusal.

Mr. Gray, who (with Mr. M'Mahon) appeared for the prosecutor, said the writ did not say how much the defendants were to pay.

Mr. Justice Hill: The defendants say they do not deny their liability. If they did not, the prosecutor should have gone before an arbitrator or magistrate.

Lord Campbell, without calling upon the other side, said he thought the court was quite right in granting the writ, and would also be right in holding that this was a valid return. The defendants might traverse the allegation in the writ, and show that the obligation to do the act commanded never was created. The granting the writ was not conclusive as to anything on which the obligation to do the act depended; and if there was a condition precedent, that might be traversed, and was ground for a return.

The other judges were of the same opinion.

Judgment for the defendants.

Thursday, Jan. 27.

THE QUEEN *v.* THE CHELTENHAM WATER-WORKS COMPANY.

Mr. Phipson moved for a rule calling upon the Cheltenham Water-Works Company to issue their warrant to the Sheriff of Gloucestershire to summon a jury to assess the compensation payable to the applicant, C. C. Higgs, by reason of the diversion by the company of the whole of the water of the Northfield spring, over and above the water arising and flowing therefrom in short water time. The Cheltenham Water-Works Company was incorporated in the year 1824, and had power under their Act to divert water which flowed from the said spring into the river Chelt, and previous to the year 1829 they had so diverted the water, and used it for their own purposes, and had thereby diminished the supply of water to Mr. Higgs's mill, called "Sandford Mill." In the year 1829 Mr. Higgs and the company referred it to arbitrators and an umpire to assess the amount of compensation to be paid to Mr. Higgs for that damage, and also to fix and ascertain the mode of determining the quantity of water to be from time to time taken by the company from the said spring. The umpire, in June, 1829, made his award, in which he ascertained the sum to be paid for that diversion; and he also directed that the company should be at liberty to take from the spring 32 gallons a minute. He also found that the whole quantity of water at short water time was 64 gallons a minute, and he directed that the company should fix a pipe with a nozzle to ascertain the 32 gallons a minute which they were to take. He went on to say that the company might, if they thought fit, take the other 32 gallons, being the residue of the 64 gallons, and that they should fix a pipe with a nozzle to ascertain what portion of the residue they might take, and that the residue should be paid for on the same terms as the first 32 gallons. The company had acted on that award, and had taken the 32 gallons, for which they had paid, and they had also taken 20 gallons a minute more, making 62 gallons a minute, and paid for it. No dispute arose upon that. That being the state of things, in November, 1854, the company gave Mr. Higgs notice of their intention to divert the whole of the said spring, and expressed their readiness to make him compensation, and proposed an arbitration to ascertain the amount. Subsequently, under the superintendence of the company, the flow of water had been gauged, and it was found that the whole average flow was 129 gallons a minute. They had thus taken 65 gallons a minute with which the arbitrators had not dealt at all. A correspondence took place between Mr. Higgs and the company on the subject, and on the 7th of February, 1855, Mr. Higgs wrote to the company, and called upon them to pay for the 12 gallons which they had taken beyond the 52 gallons; and the clerk to the company replied by saying that they were willing to pay, provided Mr. Higgs would sign the deed which he forwarded. The deed in question was a grant of the whole of the water, and Mr. Higgs refused to sign it. A further correspondence took place, and in October, 1858, Mr. Higgs called on the company to pay for the 12 gallons, the residue of the short water time, and to make him compensation for the other 65 gallons which were not dealt with by the arbitrator. The company then paid for the 12 gallons, but they had not made compensation for the other 65 gallons. He then called upon the company to issue their warrant to the Sheriff of Gloucestershire to summon a jury to assess compensation, and informed them that, in case of their refusal, he should apply to this court for a *mandamus*.

Lord Campbell asked on what the learned counsel founded his application?

Mr. Phipson said, the statute of 1824, which incorporated the company, gave a remedy of application to justices; but by another statute of 1839 it was provided that the remedy should be by warrant to the sheriff.

Lord Campbell: You are now acting under that power?

Mr. Phipson said he was.

Lord Campbell: You may take a rule to show cause.

Rule *nisi* granted.

Miscellaneous News.

STOKE FENTON AND LONGTON GAS COMPANY.

The Ordinary Half-Yearly Meeting of Proprietors was held at the Town Hall, Stoke-upon-Trent, on Wednesday, the 19th ult.—F. W. Tomlinson, Esq., the chairman of the board of directors, in the chair.

The advertisement convening the meeting having been read, the Secretary then read the report of the directors:—

In the report made to the shareholders at the half-yearly meeting in August last, the directors intimated that it would be their duty to protect your interests, under legal advice, against the attempt being then made by the proposed Longton Gas Company (Limited) to lay down mains and services in the Longton district without the requisite parliamentary authority. In the discharge of that duty, informations were laid, under the Local Lighting and Watching Act, against the parties employed by the Longton Company, for obstruction to the public streets. On the first information heard before the stipendiary magistrate in August last, the defendants were convicted in the penalty imposed by the Act. They had the right of appeal to the next Quarter Sessions against the conviction, but did not avail themselves of it.

The hearing of the remaining informations was adjourned to the 27th of September, and the justices at Hanley, in the teeth of the stipendiary magistrate's decision, dismissed the cases. Further informations have since been laid, the hearing of which has been twice adjourned at the instance of the defendants. In the meantime the directors, under the advice of counsel, gave instructions for an indictment for a nuisance against the Longton Gas Company (Limited) and their servants employed in laying down mains and services in Longton, to be preferred at the Quarter Sessions in October last, when a true bill was found against all the parties, and they were required to appear to and answer the indictment at the Quarter Sessions just terminated.

The prosecutors attended fully prepared for trial, but the defendants did not think proper to appear, and are liable to legal proceedings for their default. The indictment will now be removed into the courts at Westminster, in order that it may be tried before the judges at the assizes. The reluctance of the Longton Gas Company to test the legality of their proceedings by an authoritative judicial decision, affords its own comment; and it can hardly be doubted that the law which was laid down by the judges of the Court of Queen's Bench in the memorable Sheffield case will be adhered to, and must prevail in the present one.

The result of the rejection by the Longton Commissioners of the tender of this company, and of their entering into a contract with the new company long before they were in a position to carry it out, has been, that the public lamps of the town of Longton were not lighted during the past winter, unless a feeble attempt partially to substitute naphtha for gas, making darkness visible, can be so regarded.

The directors have given notice, under the 9th section of the British Company's Act of last session, of the desire and readiness of this company to purchase the property and interest of the British Company in the parts of the parish not comprised within the borough of Hanley, and negotiations for the purchase are now pending. The directors felt that they were laid under an obligation to carry out the arrangement imposed upon them by the select committee of the House of Commons, to which the bills of this company and of the British Company were referred, that each company should be confined to the district which its works occupied, and of which it had, in point of fact, the possession. It was in conformity with such arrangement that this company was denied by the parliamentary committee the power of extending their mains into the boroughs of Hanley and Newcastle. The injustice, then, of a new company, without parliamentary authority, being suffered to invade the district thus appropriated to the Stoke Fenton and Longton Gas Company, at so great sacrifices on their part, is consequently the more manifest.

The accounts of the company for the year ending Oct. 1, 1858, have been audited by Messrs. George Sibary and Herbert Keeling, the auditors appointed under the provisions of the company's Clauses Act at the last meeting, and the balance-sheet signed by the auditors is submitted with the said accounts to this meeting. The capital account shows a balance of £293. 12s. 1d. of expenditure in excess of receipts during the year; but there are liabilities which have been incurred in addition amounting, after giving credit for arrears of calls, to £197. 8s. 10d., principally for an outlay in carrying the company's mains to Dresden, a suburb of Longton, to meet which the directors have made a call of £1 upon the 500 new shares.

The account of revenue and expenditure exhibits a very satisfactory result, namely, very slightly diminished receipts for gas-rental, notwithstanding a reduction of one-tenth in the price of gas, accompanied by a material reduction in expenditure.

The Chairman, on rising to move the adoption of the report, stated that the accounts, which were comprehensive and clear, would be found on examination to bear out the favourable mention in their report. They were aware of an opposition company being established to light the town of Longton, although Parliament had laid it down almost as a principle that competition should not be encouraged, being considered actually injurious to the public. That company having started without parliamentary authority, we had good ground in law and equity for supporting our position in the district, and certainly intended to take the opinion of the highest courts whether an unincorporated company could with impunity carry on a competition with a company incorporated by Act of Parliament. The board of directors had given great attention to the successful progress of their undertaking, and were in a good position for maintaining their stand in public estimation. The auditors being elected by the proprietary must be considered responsible to them in the performance of their duties. The board had, by a resolution of the 11th of December last, appointed Mr. A. Young to the office of secretary, in addition to his office of manager, and as at this the first ordinary meeting held in the year next after that in which the special Act was passed, the whole of the directors appointed by that Act are to retire from office, he hoped they would find a body of gentlemen who would serve them better.

A Proprietor: You will create a panic if you retire from office; we have the greatest confidence in the board, and earnestly hope they will assent to re-election.

A Director: Several of us have acted now for many years at great sacrifice of time and would willingly make way for new men, but as we are not disposed to desert our post in times of difficulty we shall comply with the wishes of the proprietors.

Resolutions having been passed unanimously, adopting the report—re-electing the board of directors—approving of the accounts, &c., a vote of thanks was passed cordially acknowledging the valuable services of the board of directors, and to the chairman for his able conduct in the chair, which terminated the proceedings.

CITY OF LONDON GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held at the Office, Dorset Street, Salisbury Square, on Wednesday, Jan. 19—R. A. Gray, Esq., in the chair.

The notice convening the meeting having been read, the minutes of the last half-yearly meeting were submitted and confirmed.

The Secretary (Mr. R. J. Millar) then read the following report and statement of accounts:—

In meeting you on this occasion, your committee feel considerable satisfaction in being able to submit a statement of their proceedings during the last half year, by which it will be seen that the affairs of the company are in course of steady improvement.

The works are in a thoroughly efficient condition, proved by the fact that the utmost requirements of the district during this dark winter have been satisfactorily met. Some additions to the mains have been made since Midsummer, at a cost of about £350, which, with those mentioned in the last two reports, have proved most serviceable in keeping the district adequately supplied. A further addition to your plant, to the extent of about £225, has also been made during the half year, in the completion of connexions, &c., to the wash-vessels and purifying-house.

Your committee submit to your attention the accounts, duly certified by the auditors.

The rental for the half year is £35,162. 13s. 10d., being an excess, compared with the corresponding period of 1857, of £2641. 9s. 3d. The rental for the whole year is £73,465. 4s. 6d., being an increase on that for the preceding year of £3399. 8s. 6d.

The profit and loss account, your committee are gratified to observe, is equally satisfactory. The profit for the half year, as shown in No. 1 statement, is £9780. 19s. (subject to income-tax), being £2644. 6s. 1d. over that of Christmas 1857, arising chiefly from the favourable purchases and contracts for coal made by your committee, and from an improvement in the coke account of about £1200.

Your committee, after mature deliberation, have considered that the period has arrived for providing a fund for future emergencies; they have, accordingly, transferred from the profit and loss account the sum of £5000 to a reserve-fund, which leaves the amount of profit now at your disposal (per No. 2 statement), £14,183. 1s. 3d., subject to income-tax. Out of this sum your committee recommend you to declare a dividend for the half year at and after the rate of £5 per cent. per annum, the sum to be payable as heretofore, free of income-tax.

Your committee have now to call your especial attention to the Act of Parliament under which the company is incorporated. You are aware that their undivided attention has for a long time been directed to every improvement by which the works might be rendered free from objection in a sanitary point of view; and that they have succeeded to a very great degree is apparent from the testimony of the neighbourhood, and from the fact that the sanitary condition of the locality in which the works are situated bears favourable comparison with any part of the City or the metropolis.

Under these circumstances, and after much anxious consideration, your committee have caused a petition to be deposited in the House of Commons for leave to bring in a bill to perpetually incorporate the company; to give power to increase the capital to £400,000; to vary the qualification of directors; and to remodel the existing shares. Should you confirm their proceedings, it will devolve on your future committee to prosecute the matter when Parliament assembles.

It is with much regret your committee report the death of one of the company's oldest officers, Mr. Bugby, late clerk of the works, which occurred on the 12th of September, after a long and faithful service of thirty-seven years. Mr. Bugby has been succeeded by Mr. Henry Miller, who has for some time acted as deputy-clerk of the works. This latter vacancy your committee hope it will not be necessary to fill up for the present.

Pursuant to the Act of Parliament, your committee resign their seats, and place the same at your disposal. They offer themselves for re-election, and should it be your pleasure to accept the offer of their services, they will readily devote their best energies to promote the prosperity of the company.

R. A. Gray, Chairman.

STATEMENT OF PROFIT AND LOSS, FOR THE HALF YEAR ENDING CHRISTMAS, 1858.

Dr.		*Cr.*	
By cost of coals consumed, including porterage	£16,072 2 1	To rental	£35,162 13 10
Rent, rates, and taxes	1,664 10 5	Coke	6,949 12 7
Wages	6,733 4 2	Breeze	182 12 0
Committee of management and auditors	515 11 0	Liquor	605 0 6
Salaries	1,915 0 0	Tar	582 0 0
Tradesmen's accounts	5,339 2 2	Old materials, &c.	442 19 0
Repair and depreciation of meters	528 4 7		
Petty cash disbursements	342 12 1		
Interest	630 4 1		
Bad debts, &c.	403 8 4		
Balance	9,780 19 0		
	£43,924 17 11		£43,9 2 .
		Half year's profit brought down	£9,780 19 0

GENERAL BALANCE-SHEET.

Dr.			*Cr.*	
By capital	£300,000 0 0	To plant	£293,190 0 1	
Due to trustees of loan-fund	25,475 0 11	Leasehold property	5,184 0	
Reserve-fund	5,000 0 0	Due for light	£27,595 17 11	
Debts due to sundries	20,560 6 4	Coke, &c.	3,197 6 0	
Balance carried down	14,183 1 3	Sundries	940 6 7	
			31,733 10 6	
		Cash on hand	£2,527 19 0	
		Petty cash	28 8 7	
		City gas shares	9,144 15 0	
			11,701 2 7	
		Stock on hand—		
		Coals, &c.	£2,363 6 9	
		Materials	1,886 13 7	
		Meters	19,159 14 2	
			23,409 14 6	
	£365,218 8 6		£365,218 8 6	
		Disposable balance brought down	£14,183 1 3	

The Chairman said,—Gentlemen, if you have felt pleasure in hearing the report read, you may easily conceive the gratification which the committee have experienced at being in a situation to present such a report to you. At the same time, it cannot be concealed from you, that during the last half year we have had many matters of great importance connected with these works to contend with. We believe that our reputation for supplying good gas in a sufficient quantity to our customers remains unimpaired; and whilst we have been anxious to extend the interests of this company, we have sought no means of doing injury to any other. On the contrary, I may say that when it came to our knowledge that the Great Central was put to a temporary inconvenience some little time ago, by which a strong feeling of displeasure was created among their consumers, we gave most positive instructions to our inspectors that under no circumstances should they apply to their customers to come to this company; and I believe, upon my conscience, those instructions were rigidly observed. I sincerely trust that, if any circumstances should arise by which this company was placed in a similar situation, we shall receive from them the same consideration that we have manifested on our part towards them. I cannot say that the circumstance I have alluded to has been wholly unattended with advantage to us, inasmuch as some eighteen or nineteen consumers made application to us, and we had no alternative but to take them, which has given us an additional rental of about £500 a year. We have stated to you in the report that it is our intention to go to Parliament in the next session to ask for an Act of Incorporation in perpetuity. On a former occasion of our application, we encountered an unexpected opposition, and we considered it expedient for the interest of this company not to press that bill. We think we may proceed on the present occasion without that difficulty; but if I were to say that I expect to do so entirely without opposition, I should be misleading you. I do not think that any valid objection can be urged against Parliament granting us what we ask for. The character which we enjoyed in 1856, when we went before the Commissioners of Sewers to defend our conduct, we enjoy at the present moment; and I have no doubt whatever that the gentlemen who then came forward to bear their testimony to the manner in which our works are conducted, will be quite prepared to render us similar assistance on the present occasion. I hope that may not be required. Before we came to the decision to apply to Parliament for this Act, we took the opinion of some of our friends around us as to whether they considered the time was an opportune one to make the application; and they were all of opinion that if we did not apply to Parliament for an extension of the Act, we should be guilty of a dereliction of duty. Acting upon that, we gave instructions to our present solicitors, Messrs. Payne and Layton (Mr. Timothy Tyrrell, our late solicitor, having retired from the profession), to prepare the necessary notices. Those notices have been given, and I am happy to inform you that the standing orders were passed yesterday. That is one stage in our career that is satisfactory, because it might happen that you would be put to some expense by an opposition upon standing orders. But we have passed that; and it will be the duty of the committee who are to be elected to-day to prosecute the bill with all the vigour they possess, and I invite you, who have a great interest in obtaining the Act of Parliament, to give the committee all the co-operation which it is in your power to afford in forwarding that object. We have engaged counsel of the highest eminence to conduct our case in Parliament; and when I tell you that Mr. Hope Scott and Mr. Burke are the gentlemen we have employed, you will readily agree in the truth of what I say. You are aware that, when we went to Parliament to oppose the Great Central Company, we had the good fortune to have the services of that able man, the Honourable Mr. Talbot, but, unhappily for us and for his family, he is not now with us—he is dead. It is necessary that I should advert to one or two circumstances which took place before the committee of the House of Commons when Mr. Croll gave his evidence, on the occasion of the Great Central Company obtaining the bill, upon which, I think, in some measure, the committee came to the resolution they did, which was this:—"It has further appeared that the old companies steadily refused to make the required concession, and were only induced at last to do so by the organization and perseverance of the promoters of this bill, and that the consumers, therefore, are indebted to the promoters for the advantages thus obtained." Now, it is very far from my wish to create any difference of opinion between Mr. Charles Pearson and Mr. Croll, but circumstances have recently come out to which I must call your attention, not in an unfriendly spirit, but only to show how it was that, in my opinion, the committee exercised more consideration towards the promoters of that bill than I think they would otherwise have done. Mr. Croll stated in his evidence that gas at 4s. per 1000 feet would give a surplus profit—after paying 10 per cent. upon the capital—of 6d. per 1000; and that calculation was based upon the price at which he had contracted to supply the gas to the company, viz., 1s. 4½d. per 1000 feet. There was to be a profit upon that of 10 per cent., and something more. What is the actual state of things? I have always said it is commercially impossible, if the works are kept in proper order, for any man living, however ingenious he may be, to supply gas at 4s. and give 10 per cent. profit. What has been the result with the Great Central? I am a shareholder in that company. Why did I become so? Simply because I like to have information from the fountain-head; I would scorn to get it in any other way. That is the reason I am a proprietor, and not, as you may suppose, owing to any great love that I have for that concern. What was their dividend last December? 2½ per cent.; and for the previous half year it was only at the rate of 1½ per cent.; so that this mighty company has come down from its boasted 10 per cent. to 3 and 4 per cent. And what does Mr. Croll state before the arbitrators? Why, that unless he got 2s. 1d. per 1000 feet for the gas, he should derive no profit for himself. Therefore there is the difference between 1s. 4½d. and 2s. 1d., which comes to what I have all along stated—that it is impossible to pay 10 per cent. with gas at 4s. a 1000. Now, Mr. Charles Pearson, to test, as he said, the accuracy of Mr. Croll's statement, bought some shares of Mr. Croll in the Tottenham Company, although the assertion of Mr. Croll was that Mr. Pearson never held any shares in that company; and Mr. Croll, in his evidence before the arbitrators on the 2nd of February, 1858, stated that he had made an enormous loss by the manufacture of the gas at that price, and that Mr. Pearson had received between £6000 and £7000 from him, including interest, as being the only way in which he could secure that gentleman's services on his behalf. You know it is said, "When some people fall out, others get at the truth." As respects our own com-

pany, you will see that we are now in a better position than we have been for several years past. I will briefly state to you what has been the progressive improvement in our position. In 1854, with a rental of £60,023, we divided 3 per cent.; in the next half year, 3½ per cent.; in the half year succeeding that, owing to heavy expenses in reinstating the retorts, the dividend was reduced to 2½ per cent. At Christmas, 1856, the dividend was again 3 per cent.; at Midsummer of the following year it was the same; and we have now the pleasure of giving you a dividend at the rate of 5 per cent., leaving a balance of undivided profits of £6700, after appropriating £5000 to the contingent-fund. Now, in order to show that this company was not obnoxious to the charge of seeking its own aggrandisement regardless of the public interests, I may state the various reductions that have been made in the price of gas voluntarily on our part, and without any public pressure upon us to do so. In 1821 the price of our gas was 15s. per 1000; in 1828 it was reduced to 13s. 6d.; in 1831 to 12s. 6d.; in 1833 to 10s.; in 1836 to 9s.; in 1843 to 8s.; in 1844 to 7s.; in 1848 to 6s.; and at Midsummer, 1849, to 5s. On the latter occasion we attended before the City Commissioners of Sewers, and no men could be more cordially received than we were. The commissioners expressed the highest gratification at our liberality, and we concluded that we should hear no more from that body until we went before them the next year to renew our contract for the public lights of the City; but to our surprise, in the following November, we found them clamorous in support of a new company, who were to supply gas at 4s. That shows the consistency of some people. But I have no doubt we shall get out of all our troubles; and if energy and perseverance on the part of the managing committee can accomplish it, you may be sure of it. To show how deleterious these works are to the health of those who are engaged in them, I may mention that we have with us now workmen who have been engaged on the premises for many years—viz., three, 21 years; two, 22 years; three, 24 years; two, 25 years; three, 26 years; one, 27 years; three, 28 years; one, 29 years; one, 31 years; one, 32 years; one, 33 years; one, 34 years; two, 35 years; and one, 38 years. Well, gentlemen, whatever other people may say or think, we have had no experience that the lives of those engaged in gas-works are in anyway shortened. My belief is, that they derive great benefit from coming to work, and that they are unusually exempt from disease. It is no less singular than true that during the prevalence of cholera in New Orleans, no person employed in the gas-works was infected by the disease, whilst the population resident in the vicinity of the works enjoyed a remarkable immunity from it; and the same results had occurred in Barcelona and other places. Now allow me to say that with respect to the course that may be taken by the Corporation of London I am perfectly ignorant, but I cannot for one moment believe that the present Lord Mayor, who has raised himself to his present distinction by his own industry and integrity, will ever permit the influence he possesses to operate to the prejudice of this or any other company. When this company was first incorporated, it was never the practice of Parliament to grant Acts of Incorporation except for limited periods. This was the case with the Chartered, who obtained various extensions of their Act, as also powers for raising capital, until they recently obtained their Act of perpetual incorporation, in accordance with the principle of legislation in such matters in the present day. In 1810 they got an Act of Parliament for 21 years, with power to raise £200,000. In 1816 they got the period extended 30 years, with power to add £200,000 to the former amount. In 1819 they got an Act in perpetuity, which we are now seeking to obtain; and then they obtained fresh powers to raise another £200,000. They also went to Parliament again in 1823, and got permission to raise an additional sum of £300,000. With respect to gas companies generally, if a person had to lay out a new city, it might be a question whether a gas manufacture should be established in the city; but you have to deal with things as they are, and no man will deny great benefit has been conferred upon the public by the that introduction of gas; and if the public derive so great advantage from this beautiful light, supplied at so moderate a cost, they ought to submit if some little inconvenience should result from it, which, I contend, in our own instance, is not the case at all. If Parliament refuses to extend our Act, what must be their conduct to all the gas companies in the vicinity of London? The population is rapidly increasing around the gas companies, and will any man say that property to the extent of £5,000,0000 or £6,000,000 is to be swept away upon the mere speculative opinions of sanitary commissioners? I do not believe that such a thing would be tolerated by the great body of the public. I think I have now brought my few remarks to an end. I hope I have said nothing to reflect upon my competitors in the same trade. It is my interest and my desire to continue upon the most friendly terms with all the companies engaged in similar pursuits to ourselves. There is no reason that I know of why we should not do so. For my own part, I feel no mortification if others are more prosperous than ourselves. My object is to get up to their standard of prosperity, but I would never seek to do it by any action that is unworthy of a gentleman. There is but one right principle in all trades—viz., to do to others as we would they should do to us; and if that principle prevailed, there would be far more harmony and concord in the world than is the case in the present day. That is the course we intend to pursue; and while I assure you of our undivided attention to the interests of the company—for we have a difficult game to play—I trust we shall have sufficient energy to discharge our duty in a way which will be satisfactory to your feelings and productive of good to the concern. I do not apprehend we shall experience any very formidable opposition, because I believe that our works are just as free from complaint now, and indeed more so, than at any previous period since they were established. We thought it advisable, before we proceeded to Parliament, to take the opinion of some of the most eminent men in the chemical world, and we consulted Professors Brande and Taylor, Drs. Hoffman and Odling, and Mr. Warington. Here we have their report; in one part of which they say—"We have recently inspected the City Gas-Works, and have to state that, in our judgment, those works are conducted in such a careful manner as to prevent any nuisance to the surrounding neighbourhood." Then we have also a report from Mr. Abel, a director of the chemical department of the Arsenal at Woolwich, which will be, I am sure, equally satisfactory to you. I believe that the course we have adopted in going to Parliament is the correct one, and the one most advantageous to this company. Mr. Edward Tyrrell has expressed some dissatisfaction in not being employed to conduct our bill in Parliament; but the fact was, we thought it would not be judicious that he should be so employed, inasmuch as he is so closely connected with the City of London. It is not that we believe he would have exercised his influence as such against us, but we did not think that we ought to place ourselves in a situation in which anything like a suspicion should cross our minds that matters which had been communicated in confidence would not be so employed. We all respect Mr. Edward Tyrrell, and I must say that while he acted as our legal adviser we received all that attention which we ought to have done. With regard to Mr. Timothy Tyrrell, he has retired from the profession, and we are employing his late partners, who are as fully aware of all matters connected with the company as he was, and in whom we have every confidence. I felt it necessary to make these remarks, because some observations have been attributed to me which I did not make, and had not the slightest idea of making. I will only trouble you with one other remark, and that is with respect to clay retorts, by the use of which I think gas companies generally have derived great advantage. For my honest belief is, that if clay had not been introduced, and we had had to use iron, instead of being able to pay 5 per cent. dividends, many of the companies would scarcely have been able to keep their doors open at all. Iron retorts of the best make will not continue to work well for a period exceeding ten months, and the expense of setting a bench of iron retorts is very nearly as great as the cost of a bench of clay. Just see the difference. We have 486 clay retorts in action, 196 of which were four years old last November, without being replaced. Those taken out last year to be reset were over five years old, and had actually worked nearly four years, and all were in the most efficient state for generating gas. I believe now I really have nothing more to say to you. I hope I have said enough to satisfy you that we are in a progressive state of prosperity. We have begun the new year satisfactorily. We are getting a better price for our coke than we did formerly, and the price of coal is very moderate. I hope therefore to see you all with smiling countenances the next time we have the honour to meet you. I will now move—"That the half-yearly report of the committee of management now read be received and adopted."

The motion was unanimously adopted.

Mr. HARDWICK proposed the following resolution:—"That, agreeably to the recommendation of the committee contained in the report presented this day, a dividend out of the profits of the concern be now declared for the half year to Christmas last, upon the capital of £300,000, at and after the rate of 5 per cent. per annum; and that payment of the same, free of income-tax, be made on the first Tuesday in May next, and on each succeeding Friday and Tuesday, between the hours of twelve and one o'clock." He would not say one word which would in the least degree interfere with the very excellent remarks from the chair. He was quite sure the proprietors would all agree with him when he said that they were deeply indebted to the chairman and directors for bringing about so satisfactory a state of things as that which was now presented in reference to the company's affairs.

Mr. LAVANCHY seconded the resolution, which was at once adopted.

Mr. WARD said he had been entrusted with a resolution expressing the approval of the proprietors in the step taken by the directors. They had heard that the committee were going to Parliament in the ensuing session for an Act to incorporate the company in perpetuity. The proprietors were all aware that the existing parliamentary incorporation would terminate in 1863; and if that were so, then on the first principle of life, which was self-preservation, the proprietors should give their cordial support to the effort now about to be made to renew their powers, and to obtain perpetual incorporation. He thought the present an opportune time for coming forward, and that now they would not be met with any spirit of injustice, which, acted upon by popular clamour, might some time ago have induced Parliament to insert a clause in their bill compelling the company to remove their works elsewhere. The present capital of the company was £300,000, and the committee proposed to increase that by £100,000, and also to vary the qualification of the members of the committee. Heretofore that qualification had been the possession of an inconveniently large stake in the concern, and he believed it was the committee's own wish to have that amount reduced.

Mr. J. K. HADLAND seconded the resolution, which was adopted.

The chairman having vacated his seat, Mr. HARDWICK was elected chairman *pro tem.* On taking his place, he proposed the very cordial thanks of the proprietors to the committee of management who had now retired from office. The proprietors owed them a debt of gratitude for the great persistence, assiduity, and attention with which they had watched over the interests of the company. Their chairman had presented them with a very interesting history of the company's affairs, of the dividends they had paid, and the reductions in the price of gas which they had effected, and he (Mr. Hardwick) thought he could safely say that there was scarcely another company in London which could have risen, amidst all the opposition which this company had encountered, from 2½ to 3 per cent., and now to a 5 per cent. dividend. Let them hope that, if the lives of their excellent friends were preserved for a few years, they would be able to realize a still larger dividend.

The vote of thanks was very cordially adopted, and the retiring committee of management unanimously re-elected.

Mr. GRAY, on taking the chair again, acknowledged his obligations to the proprietors for the renewed expression of their confidence, and promised that, so long as he had the honour to occupy his present position, he would devote his best energies to the interests of the company.

The DEPUTY-CHAIRMAN (Mr. Sangster) also returned thanks. In doing so he said he had been frequently asked how it was that the City Gas Company did not pay so high a dividend as some others. The answer was obvious. Other companies had the opportunity of charging 4s. 6d., and in some cases 5s. per 1000, for their gas. If the City Company could add another 6d. to their price, it would make a difference in their favour of several thousands of pounds per annum.

Messrs. Cozens, Curling, and Hadland, the other members of the committee, severally returned thanks; and on the motion of the chairman, thanks were presented to Mr. Hardwick for his temporary services in the chair.

Mr. J. Lamb and Mr. J. T. Hadland were re-elected auditors, and Sir Charles Price re-appointed treasurer of the company.

The CHAIRMAN, in proposing Sir Charles, said he had done important service to the company. At one time his honourable friend had advanced to them as much as £10,000 to meet their necessities. That debt was now reduced to £2000, and he hoped the next time they met it would be altogether paid off.

The proceedings then terminated.

REPLY OF THE DIRECTORS OF THE CHARTERED GAS COMPANY TO THE REPORTS OF MESSRS. HUGHES AND ARNTZ ON THE PUBLIC LIGHTS OF WESTMINSTER.

The Board of Works for the Westminster district some time since published a pamphlet upon the subject of the contracts for supplying the parishes under their control with gas, the joint production of Messrs. Hughes and Arntz, the former gentleman being a civil engineer and a member of the board, as well as one of the secretaries to the managers appointed by the delegates from the various metropolitan parishes, with reference to the supply of gas to the metropolis; the latter gentleman being surveyor to the board, and an associate of the Institution of Civil Engineers.

This pamphlet purports to be a record of experiments made to ascertain the consumption and *cost* of gas supplied to the public lamps in the Westminster district of the metropolis; and it is therein boldly asserted that the gas companies supplying those lamps with gas have been "*imposing*" upon the parish to the extent of no less a sum than £2012. 6s. 1d. per annum.

Such a charge would justify the use of very strong language, but the

directors do not condescend to imitate a style which every one must condemn, but will content themselves with exposing the extraordinary fallacies contained in the pamphlet. This even they would not have troubled themselves to do, had its circulation been confined to the members of the board alone; but the board having adopted the course of sending a copy to every parish included in the Metropolis Local Management Act, the directors consider that the time has arrived for the refutal of statements so erroneous, and for the exposure of the incompetence of the two amateurs who have so recklessly misled a public board, and traduced important public companies.

It will be seen by the report that it is divided into two parts, the first showing the experiments made by Mr. Arntz; and the second, observations and calculations based on them by Mr. Hughes. The plan adopted seems to have been suggested by Mr. Hughes, and it would appear from this that Mr. Arntz was merely employed to make the experiments, and is therefore responsible only for their correctness, and not for the calculations; in fact, he evidently disagrees with Mr. Hughes on several points hereafter alluded to. But Mr. Arntz comes forward with all the authority of a man professedly conversant with the whole subject, gives new laws as to the discharge of gas through orifices, which are not supported by his experiments, and which are totally at variance with the well-known formula for the discharge of gaseous fluids.

The experiments were made upon the gas supplied by three gas companies—viz., the Chartered, Equitable, and Western; the Chartered and Western supplying cannel gas, and the Equitable common gas.

The terms of the several contracts the directors believe to be correctly stated; but it should be observed that although the contract with the Chartered Company specifies that each burner shall consume 2½ cubic feet of gas per hour, it also requires that the burner shall give an amount of light equal to 10 sperm candles; it is therefore quite clear that the contract is virtually for quantity of light; and that this is so is fully proved by the Western and Equitable contracts *only specifying* quantity of *light*, and the number of feet required to give that light being left *entirely* to those companies.

In making experiments which are to decide upon the integrity of public companies, and the manner in which they perform their contracts, every care should be taken and means adopted to insure that accuracy which the important nature of the inquiry demands, and to make the experiments on so large a scale as to defy criticism. It is, however, scarcely credible that in the case of the Chartered Company only *eleven* burners out of *eight hundred and thirty-two*, or not *one-and-a-half per cent.* were experimented upon. In the case of the Equitable Company the number was *three* out of *seventy-five*, or 4 *per cent.*, and in that of the Western Company *four* out of *one hundred and eighty-two*, or 2¼ *per cent.*

The mode adopted by Messrs. Hughes and Arntz in making these experiments is one which no one conversant with the subject would employ, as it is open to many objections, and requires the nicest manipulation, in order that all the conditions of the experiment and the actual fact should be identical.

The pressures were taken by means of a pressure-gauge of very small bore, while the burner was alight, and also with the orifice closed; the pressures were then recorded, and the burner unscrewed. Subsequently it was placed upon an experimental meter, and, as nearly as possible, the same pressure of gas being then put upon it as it had when on the lamp-post, the quantity of gas consumed per hour, as indicated by the experimental meter, was ascertained, and was assumed to be the same as the consumption on the lamp-post. The great difficulty is, however, to get the pressure identical with what it has been three or four days before. The capillary effect produced by the small bore of the tube of the pressure-gauge, its dryness or wetness, and many other little points, render this part of the operation very unsatisfactory at the best, even in the hands of those most capable of undertaking such experiments. That such is the case is abundantly proved by an examination of the tables, not one of which bears out Mr. Arntz' new theory of the discharge of gas being as the pressure, or even of the recognized law of the discharge being as the square root of the pressure; and the conclusion at which one must inevitably arrive is, that the whole of the experiments are utterly worthless. On referring to table E of the Western Gas Company, the first experiment (there were only four made) shows that with 26/10ths pressure 3·8 feet of gas were discharged; at 16/10ths the very same quantity; and at 9/10ths, or about one-third of the highest pressure, the discharge was 3·7 feet, or only 1/10 of a foot less, whereas, according to the new law of Mr. Arntz, as deduced from these experiments, the discharge should have been respectively 2·33 and 1·31 feet.

Mr. Arntz is evidently surprised at this result, and naïvely observes that it is unsatisfactory, "*as, notwithstanding that the pressures in the streets were correctly taken, the burner would not afterwards bear nearly so great a pressure as that given in the first observation.*" Why not? If the burner would bear it on the lamp-post, why would it not do so equally well on the experimental meter?

Futile, however, as this experiment is, there is one still worse. In table B, Chartered gas, lamp 7, it is stated that a burner with 2/10ths pressure discharged ·88 of a foot per hour, and with a pressure of 1½/10ths or ½/10th less, the quantity discharged is actually *more*, it being ·95 feet, or about 8 per cent., whereas, according to Mr. Arntz' theory, it should be ·66 feet.

After such experiments as these, it would seem scarcely necessary to pursue the inquiry any further, were it not that calculations have been made upon the assumption of their being correct, and by which it is made to appear that the gas companies have been *imposing* upon the parish to the extent of £2012. 6s. 1d. per annum, of which amount the Chartered is held liable for £1750. 13s. 4d.

Again, on referring to table D, Chartered gas, it appears that on the 22nd of June, 1858, at two o'clock in the morning, experiments were made upon *three* burners supplied with cannel gas, and, as one of the three showed a consumption of ·63 feet per hour, it clearly follows, that if this experiment was reliable, one-third of the whole of the parish lamps, or 277, were supplied with only that quantity of gas per hour, which would have rendered the light afforded by them comparative darkness; and this would have been the case not only with St. Margaret's and St. John's parishes, but with all the other parishes supplied with cannel gas, as well as with the parks, Queen's palace, Houses of Parliament, &c. (for the same description of burners, the same gas, and the same system of mains are common to all); yet, in the face of all this, there were no complaints made by any of the parish authorities, or police; and it is a curious fact that this same Westminster Board, although presumably believing that they were being *imposed* upon to the extent of £1750. 13s. 4d. by the Chartered Company, have up to the present time continued quite satisfied with the way in which the contract has been performed, if the fact of their not having made any official complaint to the company may be taken as evidence of their satisfaction.

The next point to which attention is required, is the startling statement of Mr. Arntz, that when gas is burnt experimentally it gives a result 20 per cent. better than when burnt practically; or, to use his own words, "*allowing 20 per cent. for difference between experiment and practice.*"

After the statement of the way in which these experiments have been made, and the false deductions formed from them, no one can be surprised at any startling theory coming from the same authority; and the directors are compelled to confess their inability to surmise the meaning of Mr. Arntz. When gas is burnt, it is presumed to give the same amount of light whether burnt on the top of a lamp-post or on the top of an experimental meter, yet we are gravely told in the former case the same gas gives 20 per cent. less light than in the latter. What, then, becomes of the meaning of the words in the several contracts, that each burner is to give a light equal to 10 sperm candles?

Referring to the experiments on the Equitable Company's gas, at p. 5, Mr. Arntz says, "*The Equitable Gas Company is under no restrictions as to the quantity of gas to be consumed, and photometric experiments would therefore have been required for a* CLOSE *investigation of their case—but the facts will probably be brought out with sufficient accuracy in the following way, viz., the gas supplied by the company is common coal gas, the illuminating power of which when burnt experimentally is such,*" &c. Now on reading the first part of this quotation, it would appear that no photometric experiments were made at all; but the second part clearly shows that experiments were made, and the gas was ascertained to be equal to 12½ candles in illuminating power. Again, with the Western Company, it is stated that 2½ feet is the proper quantity to be consumed in order to give a light equal to 10 sperm candles, the quantity required under the contract. But, with respect to the Chartered, no such experiments appear to have been made, although their contract is for the same amount of light as the other two companies; and, as the quantity of light is the real question at issue, it does appear most extraordinary that the inquiry was not specially directed to this end.

Another most singular proceeding on the part of the experimenters consists in their ascertaining the amount of consumption of the several burners of the Equitable Gas Company by the gas of ANOTHER COMPANY, which supplies the meter works of Mr. Crosley, in Southwark (the gentleman who gave voluntary evidence against the gas companies in the parliamentary inquiry of last session); and in the case of the *Western Gas Company* the experiments were made in Millbank Row with the *Chartered Company's gas:* the motive for such a proceeding certainly requires a satisfactory explanation.

Coming now to the second part of the pamphlet, viz., the calculations based upon the experiments, it will be found that none of the results as stated by Mr. Hughes can be obtained if his directions for calculating the same are followed.

He says, page 14, "*The average consumption per hour is computed for each night from sunset to the following sunrise. The consumption from sunset is assumed to be the same per hour as at* 9 P.M., *and the consumption per hour from* 2 A.M. *to sunrise is assumed not to fall below that given for two o'clock.*" This rule being applied to the experiments of Mr. Arntz, would give 8922 for the yearly consumption of the Chartered Company's burners; but Mr. Hughes says it is 7012 feet, the difference being 1910 feet, or *twenty-seven per cent.*

Again, Mr. Arntz says, at page 7, the annual consumption of a Chartered burner is 7314·6 feet, but Mr. Hughes says it is only 7012, and, if calculated as above stated, it becomes 8922; so here we have three different sets of figures arising out of the same experiment.

The following figures show the results of the three different modes of calculation on the experiments upon the three companies' burners:—

	Chartered.	Equitable.	Western.
Mr. Arntz	7314·6	14979	12833
Hr. Hughes	7012	14806	12643
Mr. Hughes's formula	8922	19140	13413

If it is difficult to understand these figures, it is much more so to understand the different views Messrs. Hughes and Arntz have of the way in which a public contract is being fulfilled by a public company, for Mr. Arntz, in speaking of the Western Gas Company, says, "*that no great fault can be found with this company;*" while Mr. Hughes tells the board that the very same company is imposing upon them to the extent of £188. 16s. 6d. per annum; it appears, therefore, that these gentlemen differ as greatly in their opinions as they do in their figures.

The directors of the Chartered Gas Company are fully prepared to prove indisputably that they not only perform their contract as to the quantity of gas to be supplied to each burner, but that they exceed it; but, as before stated, the contract is virtually for quantity of light, and taking the consumption of gas as deduced from Mr. Hughes's directions at 2·035 feet per hour, and the illuminating power of the gas at 30 candles (and it has been reported to be higher even than this by one of the metropolitan parishes), it will still give 12¼ candles for each lamp, or 22½ per cent. more than the contract requires. Also, even if Mr. Hughes's erroneous figure of 1·60 feet per hour be taken, it will still give an illuminating power of 9·6 candles, instead of 10, the amount required. This alone would be a sufficient answer to the whole report.

As to the question of price at which public lamps should be supplied with gas, and which Mr. Hughes says should be 3s. 3d. per 1000 feet for common gas, and 4s. 4d. for cannel gas, the directors have only to say that their charge for the supply of public lamps to the parish with gas was made after due consideration, that the contract was limited to one year, and involved a very considerable outlay for mains to meet the requirements of the parish to have cannel gas, and without any prospect of their getting any private lighting. The quantity and quality of the gas being stated, the board were as competent then as now to make any calculations which they might think fit, and, if they thought they were being *imposed* upon, they had the power of inflicting heavy penalties for non-performance of the contract.

The directors having now gone through all the points which appear to them to call for notice in the report, will conclude by observing that the great discrepancies it contains, the careless way in which the experiments appear to have been made, together with its manifest object, render this report highly discreditable to all concerned in its promulgation, and unworthy of the countenance of a public board.

By order of the Court of Directors.

C. BURLS, Secretary,

Chartered Gas-Works, Horseferry Road, Jan. 21, 1859.

OPENING OF MR. CROLL'S NEW GAS-METER MANUFACTORY.

The new gas-meter factory in the Kingsland Road was opened on Wednesday, the 26th ult., under the auspices of the Right Honourable the Lord Mayor, accompanied by a party of gentlemen interested in the manufacture and supply of gas.

Gas lighting, it need scarcely be said, owes its origin to Great Britain, and to English enterprise is attached the credit of first employing capital and energy in this branch of industry. Intimately connected with gas enterprise are meters, without which gas could not have been supplied without let or hindrance to the public, and it is mainly owing to the introduction of these instruments that gas lighting has made such rapid strides. It is estimated that something like 280,000 meters, value £420,000, are annually made for home use and exportation. The business is peculiarly English—large manufactories existing in London, Glasgow, and Edinburgh, from which meters are sent to Canada, India, Australia, and to the other colonies, as well as to the continents of Europe and America. We have now to record the completion and opening of another establishment, designed and built expressly for meter-making, combining in its construction the latest appliances and most approved apparatus to insure accuracy in the manufacture. It is highly important that correctness should be obtained in these instruments, seeing that in these islands alone they hold the balance between consumer and company to the extent of little short of £5,000,000 annually.

The main buildings have been carried out by Messrs. M'Lennan and Bird, builders, Osnaburg Street, New Road, from the designs and under the superintendence of Mr. William Lee, architect, St. Michael's House, Cornhill. The factory contains three floors, of an area of 8000 superficial feet, each floor being supported by cast-iron columns. They are lighted on all sides by Rogers' patent wrought-iron sashes, filled in with Hartley's patent glass, and are ventilated by flues formed in the external walls running up to the roof. The whole is constructed with a view to the health and comfort of the men, and divided into the several departments of case-constructing, leather-cutting, index-making, and brass-finishing and completion—affording altogether sufficient accommodation for upwards of 200 workmen. The spacious proving and experimenting room, 64 by 20, is lighted by a lantern, is 20 feet high, and ventilated by a large number of ornamental cast-iron panels inserted in the sides of the lantern communicating with the roof. An excellent sanitary arrangement has been carried out with the closets, &c., they being lined with Rufford's patent enamelled bricks; and a good supply of water is provided, with the necessary pipes, cocks, valves, and drains, for flushing them each day—thereby perfectly cleansing them. In every respect great care has been taken to provide for the requirements and comfort of the workmen. Adjoining the factory is the smithy and casting shop, advisedly separated therefrom—the fumes from the casting, as also the smoke from the forge, being carried into a shaft rising 40 feet above the roof of the factory.

The offices are next Kingsland Road, and have a frontage of about 100 feet. The design is in the Italian style, executed with red and white Suffolk bricks, with stone dressings and ornaments, and is an excellent specimen of Italian architecture. In the principal archway a colossal head of Old Time forms the key-stone and a corbel for supporting a clock, on either side of which are life-sized figures of Morning and Night; and above the clock pedestal is a group of figures of Childhood, Manhood, and Age—the whole being symbolic of the lapse of time. These figures have been admirably sculptured by Mr. Robert Jackson, Maida Hill, from the designs and sketches of the architect. Altogether, beauty and utility appear to have been admirably combined.

At three o'clock the Lord Mayor arrived, and was met by Mr. Croll and a large party of friends, and conducted through the establishment. The various machinery was exhibited, and its uses explained.

After inspecting the building, the Lord Mayor visited the lower fitting-room, which was handsomely decorated with evergreens, artificial flowers, flags, and banners, for the occasion, and in which an excellent dinner was laid out upon tables extending the whole length of the spacious apartment on both sides, with a cross table at the head. Here his lordship addressed the assembled workmen and their wives in a speech of considerable length, detailing the origin, progress, present position, and future prospects of the manufacture of gas. In a clear and felicitous style he traced the way in which the gradual and steady growth of this particular branch of home industry had augmented the revenue of the country—had given secure and profitable means of investment to the middle classes, and persons possessed of small capital—given an increased amount of employment not only to those engaged in coal mining, but to the shipping employed in the conveyance of coals, and, consequently, to all the various trades dependent upon ship-building. From this summary of the nature and extent of the trade of gas-making, his lordship proceeded to show the importance of honest and accurate measures of the consumption of gas, both to the manufacturers and the consumers, and after eulogizing highly the exertions of Mr. Croll in all the various departments of gas manufacture and measuring, said that his main dependence, as well as of the public, must be upon the honour, the honesty, and the intelligence of the workmen employed in the manufacture of the instruments used to record the consumption, and which ought to do justice to manufacturer and consumer alike. His lordship paid a marked and emphatic compliment to the high character and the intelligence of the working men and artizans of this country, hinted some excellent advice as to the course they should take with respect to political movements, and concluded with some most judicious remarks addressed to the female portion of his auditory as to their duties, and the immense influence they could exercise by making the firesides of their husbands comfortable and happy.

At the conclusion of his lordship's address the company, on the invitation of Mr. Croll, gave three hearty cheers, and some additional half-dozen more, to the Lord Mayor. After dinner the room was cleared for a dance, and the festivities were kept up to a late hour.—*Morning Advertiser.*

TURN-OUT AT THE MANCHESTER GAS-WORKS.

No doubt many of our readers would notice, as we did, on Wednesday evening, that the pressure of gas in their burners was so far deficient as greatly to impair the light they gave. We understand that this deficiency of pressure was caused by a turn-out of the men employed at the No. 5 station, who refused to commence their work on Wednesday morning, unless some demands which they had sent in to the gas committee were complied with. Of these the most important was the immediate dismissal of Mr. Macfarlane, the superintendent of works at the station, not only from his situation there, but from any office or employment under the corporation. It appears that for some time past there has been considerable insubordination amongst the retort men employed at the No. 5 station, arising mainly out of Mr. Macfarlane's efforts to get a fair quantity of work from them in the excavation of a pit for a gasholder in which the committee had employed them last spring, instead of discharging them when their services were no longer required, owing to the increasing length of the days and the lessened demand for gas. That there was much ground for Mr. Macfarlane's dissatisfaction with the quantity of work which they gave in return for their daily wages is shown by the fact that the pit cost upwards of £1200, whilst the committee have since made a contract for the excavation of another pit of considerably larger dimensions, for something less than £500. It is very probable that Mr. Macfarlane expressed his dissatisfaction with more energy than was agreeable to the men; and the ill-feeling of the latter appears to have been artfully fomented by persons much above them who had purposes of their own to serve.

The first overt act of insubordination took place, we believe, on Wednesday morning week, when they attempted forcibly to prevent Mr. Macfarlane from going into the yard. This led to an investigation on the part of the gas committee, and it was followed by the demand on the part of the retort men for Mr. Macfarlane's dismissal, to which we have already alluded, which we believe was laid before the committee on Friday last. On Tuesday last a deputation of the men went to the Town Hall to ask for a reply to their demands, and were told that those demands would not be complied with. On the same evening the foreman of the No. 5 station went to the Queen's Hotel during the celebration of the Burns anniversary, and had one of the members of the gas committee called out, and subsequently the mayor and the town-clerk, to whom he stated that the men were much discontented, and he was satisfied that they would turn out in the morning if their demands were not complied with; and we understand that the members of the committee with whom he had previously been in communication insisted, in no measured terms, that the mayor and the town-clerk should at once go down to the station, and inform the men that all their demands should be granted by the committee. Of course the two officials scouted the proposal with indignation, and so the matter ended for that night.

On the following morning the men assembled in the yard, but refused to go to their work or to light their fires. Information of this fact having been conveyed to the Town Hall, arrangements were immediately commenced for supplying the places of the turn-outs by calling in the assistance of the scavengers, lamplighters, and others; for the work being mere labour, any man can do it under proper superintendence. At the same time Mr. Thomas Peacock, the in-door superintendent, went down to the station, told the men that their services would be dispensed with, and began to tick off their names in the wages-book as having been discharged. This, in a short time, brought the foolish fellows to their senses, and they consented, about one o'clock, to return to their work. So much time had, however, been lost—which at this time of the year, when all the gas that can possibly be made at the works is required, was irreparable—that the pressure on the mains on Wednesday evening was, as we have stated, insufficient, to the very considerable inconvenience of many persons in all quarters of the town.—*Manchester Guardian.*

THE GOVERNMENT AND THE LOCAL BOARD OF HEALTH OF WOOLWICH.

In reply to a communication from the Woolwich Local Board of Health, General Peel, Secretary of State for War, consented to receive a deputation from that body on Saturday, the 22nd ult., relative to the long-pending dispute between the parish of Woolwich and the authorities at the War Department as to the payment of rates by military officers, and the refusal on the part of the parish to allow the Government to open the roads for the purpose of laying down gas-pipes from the Royal Arsenal to the Royal Military Academy. The deputation, consisting of Mr. Morgan (chairman of the local board), Mr. G. Hudson (the Woolwich member of the Metropolitan Board of Works), Messrs. Ruegg and Cohen, were received at the War Office on Saturday afternoon, at three o'clock, by Lord Hardinge and Sir B. Hawes, who explained that General Peel was absent in consequence of the pressure of his public duties.

Mr. G. HUDSON observed, his lordship was doubtless aware that the local board of health, acting for the parish of Woolwich, had refused permission to the commanding royal engineer to open the public roads at Woolwich for the purpose of supplying gas to the Royal Artillery Barrack and the Military Academy from the Government gas-works at the Arsenal. This step had been taken in consequence of the refusal on the part of the Government to continue the payment of parochial rates for the quarters occupied by the officers of the garrison; and the local board considered that, as trustees of the public rates, they would not be justified in allowing the War Department, or any other party, to use the parish highways beneficially whilst refusing to contribute to the local taxation. For many years past the Government had paid rates for the quarters occupied by military officers without objection, and the parish authorities could not be expected to concede privileges to the War Department which would be refused to any trading company or private individual who objected to contribute to the local funds. Mr. Hudson then alluded to the fact that an entire system of drainage had recently been completed at Woolwich, at the cost of the parishioners, and that a large additional outlay was incurred to give effective drainage to the Government establishments, for which benefit the Government had not contributed one farthing. It was probable that the whole question of rating Government establishments would shortly be settled by legislative enactment; but, as the parish authorities at Woolwich had no wish to impede the operations of the Government, they asked the War Department not to resist payment of the local rates; but if the Government still refused to recognize the claim of the parish, the dispute might be amicably arranged for the present by the payment of a fixed sum in lieu of rates—a course which the Government had already adopted with regard to several public establishments in the metropolis.

Sir B. HAWES: The dispute appears to be this:—The rates formerly paid in respect to the residences of military officers are refused to be paid in future, and the parish then refuses to allow the Government to disturb the roads in order to supply the garrison with gas. Now, in the event of an ordinary gas company refusing to pay the parochial rates, would the Local Board of Health deprive the public of the advantages of lighting by refusing permission to the company to lay down pipes?

Mr. RUEGG said that, in his opinion, this argument was not analogous to the question at issue. In the case of a public gas company, the refusal of the board to allow such company to lay down pipes would be an injury to the inhabitants, who paid the rates, but the Government denied its right to pay rates, and the object which the local board had retarded, viz., the lighting of the barracks and the Royal Military Academy, would not in anyway benefit the inhabitants of Woolwich. In that parish two gas companies existed, the shareholders of which were ratepayers, and these companies had hitherto supplied gas for the use of the garrison and the Royal Arsenal and dockyard. The Government had now erected works and manufactured its own gas, which was, doubtless, an advantage in point of economy; but it was not just that the Government should compete with these companies without being subject to the same local burdens. A committee of the House of Commons had reported in favour of rating public establishments, and it was generally understood that the Government would concede this question during the next session of Parliament. He was, therefore, surprised to find that at such a period the War Department had denied their liability to those local rates which had heretofore been recognized. He sug-

gested that the War Department should revert to the former state of the case, and pay these rates until the whole question was set at rest by Parliament.

Sir B. HAWES observed that the authorities at the War Department had refused payment of these rates in consequence of the decision of the Court of Queen's Bench relative to the liability of officers residing at Devonport Dockyard. He did not think that the Government would recognize the right of the parish to assess the quarters of military officers, but the suggestion as to the payment of a sum in lieu of rates might be considered.

Mr. RUEGG remarked that the decision of the Court of Queen's Bench affected only *bonâ fide* official residences; but many of the officers who had refused payment at Woolwich were merely tenants by courtesy, and others occupied to a greater value than the official allowance. If the War Department persevered in its present determination, all these cases would have to be tried on their own merits, and it was needless to say that heavy law expenses must be incurred.

Mr. HUDSON confirmed these remarks, and stated that peculiarities existed with regard to Woolwich which did not apply to other parishes. An appeal had recently been made to the quarter sessions against the county rate, which was the basis of the other local rates. The parish had consented to pay a fixed annual sum for county rate, taking into calculation the amount hitherto received from the Government for local rates. If this sum was no longer paid, the local board would have to pay the rates for the Government. He would also remind his lordship that the Government would save no less than £1200 per annum by manufacturing its own gas at Woolwich, and therefore he conceived that the parish was entitled to some consideration.

Lord HARDINGE said he had carefully listened to the arguments advanced by the deputation, and the matter would be fully considered by the Government. His own opinion was in favour of the course suggested by Mr. Hudson, that a fixed payment should be made in lieu of rates, and he should recommend this plan to General Peel. It was important that the matter in dispute should be settled, if possible, in an amicable manner, and an early answer should be forwarded to the local authorities at Woolwich as to the decision of the Government.

The deputation then withdrew.

MARYLEBONE GAS ABSURDITIES.

We can now believe that the agitators in the Municipal Council of Marylebone "know something about gas." This conviction is impressed upon us by observing that the name of no one of these agitators is to be found in the prospectus of the silly undertaking which promises gas at 4s. per 1000 to the consumers of St. Pancras and Paddington, as well as those of the borough of Marylebone. The concern is pretty well provided with directors and officials, but none of them possess the least acquaintance with the science of gas-making, or the theory or practice of its distribution. There are eight directors, with bankers, surveyor, standing counsel, auditor, general manager, secretary, and temporary offices—but no engineer. Having gone so far without this functionary, it is possible, had the board included the smattering of intelligence which originated the agitation of last year, that no such practical instructor would have been required. It is evident, however, that there is still a vacancy left for any person who may consider himself capable of carrying out the intentions of the promoters, which are to compete with the Imperial in the first instance, and with other establishments as opportunity offers. The means of competition are restricted to a capital of £200,000, and the instrument is of the negative quality of reduction in price, viz., from 4s. 6d. to 4s. per 1000 feet. The cause which has engendered this desire to enter the arena of competition is set forth as the melancholy condition in which consumers are placed by the districting arrangement of 1857. This measure, which, while it has enabled the companies to concentrate their energies on a given locality, and to furnish, by greater pressure as well as by improved manufacture, a light superior to that which formerly cost from 7s. to 12s. per 1000, has in no one instance been complained of by any respectable inhabitant. Some of the petty tradesmen in the vestries—those, apparently, who vend an inferior article to an imperfectly acquainted customer—made some noise when they found that they could not induce one company recklessly to oppose another; and we believe it is upon record that some six or eight private consumers, out of the million which exist in the metropolis, have outraged decency by regretting that they could not obtain gas from a rival establishment after their credit with the other had been extinguished.

The promoters of the present scheme would appear to be labouring under the delusion that these parties represent the important district which is disgraced by their misconduct; and they also appear to calculate that, to secure a body of enstomers of such a quality, it is worth while to raise capital, build works, lay down mains, and supply gas at a price which all experience has shown to be unprofitable. The promoters, on the advice by which they have been led astray, have heard somewhere or other that the Great Central has been and is a thriving concern, although it has uniformly supplied gas at 4s. per 1000, and therefore, in their ignorance, or in a wicked design to entrap the unwary, they profess to establish themselves upon a model which they accept and represent as safe, sufficient, and satisfactory.

It is not our duty, and certainly not our purpose, to enter at this time upon a disquisition in respect to the principles on which the Great Central was founded, or the manner in which these principles have been carried out or departed from. But we must, in justice to that company, as well as to the public who are tempted to embark in the Marylebone adventure, point out the various and extreme differences which exist between the realities of the Great Central and the pretences by which the new project is supported.

They are somewhat alike in one respect. The works of the one are, and of the other promised to be, erected at some distance from the metropolis. The merit of this selection lies, it seems, in avoiding nuisance to the public, which, even if real, is dearly purchased at the cost of laying mains from the point of supply to that of distribution. The distance thus traversed by the Great Central is 2½ miles; that of the Marylebone is mentioned at 10, the site being at Greenford, about 3 miles from Harrow. We do not hear that the public-spirited proprietor of this ground has given it for nothing, but it may be as well for the intended victims to consider whether they ought to accept it as a gift.

The Central possesses two leading mains—one 36 inches in diameter, the other 26; and with these it is frequently found to be difficult to convey an adequate supply, especially on any sudden emergency. We may therefore assume—for the Marylebone promoters are themselves totally ignorant on the subject—that two 36-inch mains will be required; if ever gas is to be conveyed from Greenford to Marylebone, no matter at what price per 1000. Ten miles of two 36-inch mains will cost £120,000. Here, then, in one item go six-tenths of the contemplated capital of £200,000, that of the Central being £220,000.

The area occupied by the latter company does not exceed one square mile, and from this it receives a rental of about £60,000. The new project proposes to occupy a district of upwards of eight miles in extent. The mains of the Central, within its limited space, cost about £65,000. It is, therefore, not too much to assume that with an area of eight miles, spread over a less populated district, the new Marylebone mains will require to be four times longer than that of the model on which they are to be laid out. This outlay, even supposing that the one set of mains is of the same diameter as the other (which would render a large portion of them totally inadequate as sources of supply over so large a territory), will of itself amount to £220,000. The cost of mains alone, without works at one end, or services or meters at the other, will thus swallow up no less than £340,000.

No matter; let us stretch our imagination to its utmost limit, and conclude that this immense extravagance, for the mere object of compelling the Imperial to reduce its gas 6d. per 1000 (which it will do as soon as its dividends permit, and thus annihilate competition altogether), is supported by public subscription and carried out under practical supervision,—what amount of rental is required to furnish any return upon the expenditure? The project cannot be brought into operation under half a million, 5 per cent. on which will require an annual clear profit of £25,000. Can any of the promoters tell or calculate what the absolute rental must be to attain so large a sum for dividend? They rely on the results acquired by the Great Central, which, it may be remembered, effected a reduction of 2s. per 1000 within the area of its operations. Despite this claim upon public gratitude, and notwithstanding the large amount of patronage it secured from the moment of its commencement—advantages which the Marylebone cannot anticipate to attain, even should the Imperial continue its present price of 4s. 6d.—the prosperity and solidity of the Central has not been such as to induce imitation. This consumers' company started, at least in so far as the public were informed on the subject, with a contract by which gas of elevated quality was to be supplied at 1s. 4½d. per 1000, the difference between that price and 4s. being left for management, incidental expense, and interest upon capital. Without entering into the disputes that took place between the directors and their first contractor, and without dwelling on the significant fact that the board is compelled to resume possession of its works from the hands of its second, we may assert that neither the one contractor or the other made any profit by the transaction into which they entered. Mr. Croll, in fact, unreservedly stated, in the course of arbitratorial inquiry into his claims against the company, that his profits were positively *nil*, and that his losses would have been much greater had he not, fortunately, secured a supply of coal at a time of cheapness, which extended over a long period after that article had advanced in price. As there is no likelihood of any contractor undertaking to supply Marylebone with gas, manufactured ten miles off, at 1s. 4½d. per 1000, the model fails in its similitude as well as application.

The promoters also take credit for the securities offered to consumers by their bill compelling them "to supply gas of a high illuminating power, and to furnish meters at a rental." These are simply the general clauses which are inserted in every Act, even for the smallest village in the kingdom, and are no more to be taken credit for by the instigators of the present hallucination than are the absurdities of professing to be economical in laying down mains where others already exist, or by making gas at such a distance that, through pressure and leakage, at least 20 per cent. of its quantity must be lost before any of it can reach its destination.

Some little credit is also attempted to be taken in regard to registering the concern under the Limited Liability Act, and in reducing the shares so low as £1 each. If there exists, as represented, "a strong desire on the part of many consumers to remove a monopoly so prejudicial to their interests," as that of being under the necessity of obtaining gas from one company (which is bound down on all hands by Act of Parliament, both as to its charge per 1000 and its dividends), there will certainly be no difficulty in raising the requisite capital. But if that capital is not raised, then the assertion of a strong desire existing on the part of the consumers will be established as one of those calumnies or misrepresentations in which ambitious or designing persons are apt to indulge when a fraud upon the public is contemplated. Be, however, the "strong desire" a fact or a falsehood, we are satisfied that no legal possessor of £1 sterling will entrust it to the keeping of parties who represent that works and mains to supply the "three important parishes of Paddington, Marylebone, and St. Pancras with gas at 4s. per 1000," can be accomplished by a capital of £200,000.

ENTERTAINMENT BY MR. CROLL.—On Wednesday evening, the 26th inst., Mr. Croll entertained the Right Honourable the Lord Mayor, Mr. Salisbury, M.P., Mr. Thwaites (of the Metropolitan Board of Works), and a very numerous body of the engineers and managers of the London and provincial gas companies. The dinner was served in the best style of the London Tavern, and it was indeed a gastronomic production of the most admirable description. Numerous speeches of the usual post-prandial character were made, by the worthy Amphytrion, the Lord Mayor, Messrs. Salisbury, Thwaites, Grant (of the *Advertiser*), Burls, Spice, &c.; and, to use the ordinary phrase, the utmost cordiality prevailed. Mr. Salisbury expressed a wish that a more powerful association of the gas engineers should be formed for the purpose of enlightening the Legislature. Really, the kindly spirit in which Mr. Croll met his friends, and was received by them, on this occasion would lead to the belief that such a consummation might be attained.

WELLINGTON COLLEGE.—This noble institution, great in the grandeur of its architectural excellence, erected as a memento of England's glory, was opened for the reception of students on the 20th ulto. The Royal family have taken a great interest in the building throughout, having repeatedly visited the place during its progress. A few days since, Prince Albert went to the college for the purpose of inspecting the whole of the arrangements. His Royal Highness took much interest in the gas-works and fittings for lighting the college, asking many questions of the engineer;—the whole of the work for lighting this college having been executed, to the entire satisfaction of the authorities, by Mr. George Walcott. The Queen formally opened the college on the 29th ulto., the Duke of Wellington and others of the nobility being present. Numerous gas devices were exhibited in the evening to celebrate this auspicious event.

STATISTICS OF THE PHILADELPHIA GAS-WORKS FOR 1858.—The following statement exhibits the operations of the Philadelphia Gas-Works for the year 1858:—Whole quantity of gas made during the year, 480,450,000 cubic feet; maximum daily consumption, 2,368,000 cubic feet; whole length of street mains, 255 miles; whole number of services and meters, 28,965; whole number of lights supplied with gas, 388,000. The price of gas in the city proper is 2 dols. 25 c.; Northern Liberties, 2 dols. 50 c.; Kensington, 2 dols. 70 c.; and Manayunk, 3 dols. 50 c. per 1000 cubic feet.

SUDDEN DEATH OF THE MANAGER OF THE TUNBRIDGE WELLS GAS-WORKS.—Mr. Serjeant Payne held an inquest on the 17th ult. at the Vestry Hall, Horselydown, on Mr. William Kinchin, manager of the Tunbridge

Wells Gas-Works, who died while travelling in a carriage on the South-Eastern Railway. Mr. J. Bridge, of No. 59, Stanhope Street, Hampstead Road, said on the previous Saturday night he was travelling in the same carriage with the deceased, who got in at Tunbridge Wells, at half-past six o'clock. The deceased sat on the opposite side of the carriage to him. In the interval while the tickets were being taken at Forest Hill witness looked out of the window on his side of the carriage for a moment, and on turning his head saw the deceased on the floor of the carriage struggling. He tried to lift him up, but being unable to do so, called to the guard, and he was taken out of the carriage. He thought he tried to speak, with a sort of hard breathing. He was put into the Brighton train which came up, and removed to London. As he was dead when taken to Guy's Hospital, they would not receive him, and he was removed to St. Olave's workhouse. Mr. J. E. Mackintosh, surgeon to St. Olave's Union, said he had made a *post mortem* examination of the body. There were no marks of external violence. On opening the head he found a large clot of blood on the left ventricle of the brain, and it seemed to have been formed for about a year. That was sufficient to account for death. He also found a deposit on the mitral nerves. A rupture would be easy from any sudden excitement. Railway travelling was not good for persons predisposed to an affection of the head. The shaking of the carriage was injurious. There was a degeneration of the vascular system, but apoplexy was the immediate cause of death. He should record the death as arising from apoplexy, caused by extravasation of blood from the left ventricle of the brain. The jury returned a verdict in accordance with the medical evidence.

THE LIGHTING UP OF THE NEW BARRACKS AT GOSPORT WITH GAS.—On Wednesday evening last the entire range of these extensive barracks was lit with gas, for the "proof" of the fittings, &c. There were on the occasion about 800 lights burning simultaneously for some three or four hours, and we learn that not a single defect was discovered in any one of the pipes, branches, or burners. The work has been carried out by the firm of D. Hulett and Co., of London—manufacturers to Messrs. Lucas—under the superintendence of Mr. John Deave, and is pronounced to be a well-executed application in every particular. For the officers' quarters there are lights in all the passages; the mess-room has two 6-light chandeliers, and the ante-room two 4-light ditto. In the Commandant's quarters are two 2-light chandeliers, and burners in each of the offices, kitchen, &c. The principal portion of the lights is placed in the privates' quarters: this building has twelve entrance doors, and has 32 burners taken off at each of them; to each of these entrances a main cock is attached, the value of which addition will be better explained by supposing an alteration required to the fittings of a room, to effect which it will not now be necessary to turn off the supply from the main, but simply from the tap at the entrance; thus a great security against accidents is provided, and a plan by which required alterations may be carried out in any defective portion of the fittings, without at all interfering with the lighting of the neighbouring compartments, has been adopted: this essentially requisite application is provided in each of the blocks of the building. To every main cock there is affixed one of Hulett's patent mercurial gas regulators, by which a steady and uniform light is obtained and the atmosphere freed from gaseous impurities. The average consumption of gas per hour on Wednesday evening was 2300 cubic feet, and the pressure at the extreme ends of the building, according to observations taken during our presence, did not vary one-twentieth part of an inch. The supply is provided by the company of the parish, the connexion being effected by a 6-inch pipe from the meter into the company's main at the Single Gate; from the meter a 5½-inch pipe is laid on to the other extreme, near to Weevil Gate. Much anxiety was naturally manifested by the directors of the gas company in the experiment whether they could with their present powers manufacture a sufficient supply for these barracks without curtailing any other portion of their extensive requirements; the result has been highly satisfactory, Mr. Deave reporting the gas as being very pure in quality and brilliant in illuminating properties; and as no complaints were heard from private consumers, it is fair to infer that the public did not suffer from a paucity of supply, but that a proper care had been taken that the demand should not exceed the quantity manufactured. Mr. Irons, the manager of the works of the company, personally superintended the junction of the mains and other works of importance, and gave valuable information to the *employés* of Messrs. Hulett in the application. The meter for the registry of consumption is a splendid piece of workmanship, placed at the extreme corner of the south end of the building; it is from the manufactory of Wright, of Westminster, possessing all the most modern and scientific appliances. Although the gas fittings for this establishment are said to be now completed, we understand that there are still many improvements in contemplation—among others, the erection of an obelisk, with three pendants, to be placed near the cross roads, by the Double Gates. The value of such an addition will be at once apparent to every one who has an acquaintance with the road and the traffic which passes over it. A great many people were drawn together to witness the inaugural lighting on Wednesday night, the appearance of the building being most pleasing and satisfactory.—*Hampshire Telegraph.*

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TO GAS-FITTERS, BRAZIERS, AND TINMEN.

WANTED, a Man who has a tho- rough knowledge of the GAS-FITTING, and has been used to the Braziery and Tin Work. The place will be a permanent one.

Apply, stating salary and references, to Z. A. C., Ironmonger, PETERBOROUGH.

FOR SALE, a 60-inch Cylinder PUMPING-ENGINE, built in 1818 by Messrs. Boulton and Watt, and now about to be replaced by larger machinery. The Cylinder is low pressure, condensing, and single acting, with 8 feet stroke. The pump has a Piston, single acting, lifting 8 feet, and discharges 30 cubic feet per stroke. The Engine is equal to 11 strokes per minute against a pressure of 110 feet, and capable of making a stroke on 4½ lbs. of water, or 200 strokes on each cwt. of coal of inferior quality.

The Engine is of 65-horse effective power, is to be sold without boilers or air-vessel, and may be seen at work at East London Water-Works.

CHARLES GREAVES, Engineer.
January 27, 1859.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET,
MANCHESTER,
Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

TO GAS COMPANIES.

J. W. GRAZEBROOK. 75, Old Broad Street, LONDON,

Having applications for New and Second-hand Gas Apparatus, would be obliged by those Companies having Apparatus to dispose of, to send particulars. And Companies requiring Apparatus are solicited to apply.

PIPES, RETORTS, TANKS, GASHOLDERS, &c. on Shortest Notice.

STOURBRIDGE and NEWCASTLE FIRE GOODS.

CONTRACTS TAKEN.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c. UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

WILLIAM STEPHENSON & SONS, THROCKLEY, NEWCASTLE-ON-TYNE,

MANUFACTURERS OF EVERY DESCRIPTION OF

FIRE BRICKS, CLAY RETORTS, LUMPS, TILES, *&c. &c.*

LONDON OFFICES: 76, KING WILLIAM STREET, CITY.

A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

LYNCH WHITE'S, Old Barge Iron Wharf, Upper Ground Street, LONDON.

CEMENT.

G. and T. EARLE, Hull, beg to draw the attention of Gas and Water Companies, Engineers, and Contractors, to their Light Cement, for Stuccoing and Building Gasholder Tanks, and Jointing Iron Pipes, for which purposes it will be found a very superior article.

WROUGHT-IRON Guides for Gasholders.—Designs and Working Drawings for Trussed Wrought-Iron Guides and Frames can be obtained of CHARLES DIXON, C. E., Chichester, SUSSEX.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,

GLOBE PATENT TUBE WORKS, WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

By Royal Letters Patent.

KAY'S Patent Equitable Gas-Meter is the most effective preventive of fraud by "tilting," and is as simple in construction as the common meter.

Manufactured only by

W. COWAN, 60, BUCCLEUCH STREET, EDINBURGH.

J. CLIFF'S Fire Bricks, Clay RETORTS, &c.

Orders for London and South of England to be addressed to Mr. NEWTON, Agent for the District, 13, Westbourne Terrace, BARNSBURY PARK (N.).

N.B.—A few Retorts of each size, and a large stock of Bricks and Lumps, always on hand at the above Wharf.

GEORGE CUTLER, Gasholder MAKER,

No. 8, WENLOCK-ROAD, CITY-ROAD, LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

BENJAMIN GIBBONS, Jun., DEEPDALE FIRE-CLAY & BRICK WORKS Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS, TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

BRYAN DONKIN and CO.'s improved GAS VALVES have been adopted by numerous Gas Companies in England and abroad, and their advantages and great security fully proved. Very large numbers are in use. Prices from 11s. 6d. to 13s. 6d. per inch diameter.

BRYAN DONKIN and Co., Engineers, near Grange Road, BERMONDSEY.

ALFRED PENNY, Engineer, WENLOCK IRON WORKS, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY begs to inform Gas and Water Companies that he undertakes the erection of new, or the alteration of existing, works; and that he may be consulted generally on all matters connected with gas and water supply. He is also prepared to supply best Coldblast Retorts, Socket-Pipes, and Connections, Iron Borings, &c. &c., and all the necessary Castings used in Gas and Water-Works.

*** Country orders executed with care and despatch.

WILLIAM RYDER, General MINERAL AND METAL AGENT AND MERCHANT, 4, DEAN STREET, NEWCASTLE-ON-TYNE,

is prepared to supply Gas and Water Companies with Apparatus and Appliances of every description, including Cast and Wrought Iron Goods, Coals, Fire-Bricks, Retorts, &c. &c.

Any communications addressed to him as above shall have prompt attention.

THE PURIFYING-HOUSE SUPERSEDED.

MR. LAMING (Inventor of the Revivified Oxide of Iron Purification) has the satisfaction to announce that Gas may now be purified in a manner that combines unusual commercial advantages with all the possible requirements of the sanitary officer and the public. All that need be said to call attention to the new process is, that instead of the purifying-house, two vessels of small area, placed after the condenser, suffice; that these vessels never have the least communication with the atmosphere; and that neither lime, oxide, nor any other substance foreign to the gas itself is brought into contact with it. Gas engineers will perceive among the advantages thus offered, economy in room, labour, and materials; impossibility of nuisance; and total absence of injury to the illuminating power.

Particulars by addressing RICHARD LAMING, 118, FENCHURCH STREET.

STOREKEEPER WANTED, by a Metropolitan Gas Company. He must be a thorough man of business, and if he has filled a similar situation would be preferred. Hours of attendance from 6 A.M. to 5 o'clock P.M. Salary about £140 to commence with. Age from 28 to 32 years.

Applications, stating particulars of former occupation, to be addressed "STOREKEEPER," Watlings, News Office, 409, STRAND.

M. SHEEN, Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

GEORGE ANDERSON, Gas and CONSULTING ENGINEER, 104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,

supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

JOHN ROGERSON and CO., NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

CARTER'S PATENT SAFETY GAS VALVES.

THOMAS LAMBERT and SON, PATENTEES AND MANUFACTURERS, SHORT STREET, NEW CUT, BLACKFRIARS, LONDON.

The Bank of England is fitted entirely with these Valves, from the smallest branch to the largest main pipe.

The following, among numerous Testimonials, will be found very satisfactory:—

"The British Gaslight Company's Office, No. 105, Broad Street, Ratcliff, London, June 10, 1846.

"Gentlemen,—In reply to your inquiry, I have to state that 'Carter's Patent Gas Valve' has been used by this company and by the fitters of the district extensively for seven years past. It was adopted to obviate the inconvenience of setting fast, so prevalent with the conical metal plug-cocks, and has been found to answer the purpose intended.

"I have recommended its use in several provincial towns with which I am professionally connected, and have not received any complaint of its having failed in any respect of performing satisfactorily all that is required of it.—I am, Gentlemen, yours respectfully,

"GEDDIE PEARSE.

"Messrs. Lambert and Son, Lambeth."

FIRE-CLAY RETORTS.

JOHN SWARBRICK,

MANUFACTURER OF PATENT COMPOSITION CLAY RETORTS,

FIRE BRICKS OF EVERY DESCRIPTION, SHAPE, AND SIZE, &c. &c.

HIGHER EANAM, BLACKBURN, LANCASHIRE.

These RETORTS are generally used in the Gas-works of Preston, Accrington, Bury, Heywood, Middleton, Rochdale, Ratcliffe; the Mills of Messrs. Horrocks, Miller, and Co., Preston, &c. &c., and are unequalled in having afforded general satisfaction to those who have given these Retorts a trial.

To meet the increasing demand, the Works at Little Harwood have been greatly enlarged; and Gas Engineers who may favour with an Order may rely with confidence on their being promptly supplied with an article not to be surpassed in finish or durability.

PRICES MODERATE.

WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON,

Beg to announce that, in addition to the Manufacture of

GAS-METERS,

they continue the Manufacture of

METERS FOR MEASURING WATER, SPIRITS, &c.,

commenced, under Patent in 1849, by the late Mr. William Parkinson.

These Meters are as simple and durable as the Gas-Meter, and as correct as that instrument in the registration of the fluids passing through them.

By Her Majesty's Royal Letters Patent.

JAMES MEACOCK,

PATENT DRY and IMPROVED WET GAS-METER WORKS,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

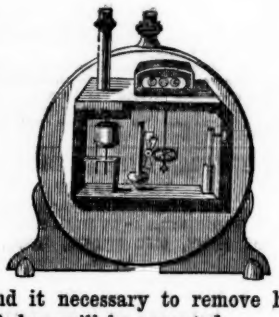
J. MEACOCK begs to call attention to his patent method of securing the Leather diaphragm of his Dry Meter. Instead of using the soldering iron for this purpose, it is held between two flat Metal Rings, and screwed up sound to a metal frame, as shown in the drawing.

By this improvement the perishing effect of hot tools to leather being avoided, its durability must be longer; also, its repair when needful is most simple, as a new leather diaphragm can be applied by merely unscrewing the old one from the rim or frame to which it had been screwed up.

Meters of Gas Companies being subject to so much wear and tear, J. M. begs leave to assure those who may honour him with their commands, that nothing but the stoutest materials for cases, the hardest gas-resisting metals, and best foreign leather for the interiors, will be used, and none but first-class workmen employed in their construction.

Wet Gas-Meters Repaired and Reconstructed with J. Meacock's Modern Improvements.

METERS SENT ON APPROVAL.



In consequence of the great demand for the above Meters, J. Meacock has found it necessary to remove his Manufactory to more extensive Premises, 16, West Street, Smithfield, where Orders will be executed on the shortest notice.

EDWARD COCKEY & SONS'

PATENT GAS VALVES.

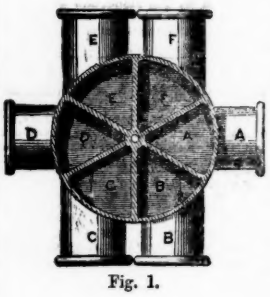


Fig. 1.

Fig. 4.

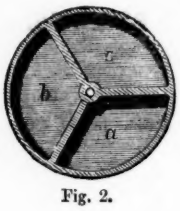


Fig. 2.

THESE Valves are formed of two cast-iron cylinders, with segmental divisions, having faces ground gas-tight, the upper cylinder turning horizontally on the lower one.

The lower cylinder has pipes from each division communicating with the vessels to and from which gas is to be passed. The upper cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one to alter the flow of gas from one vessel to another.

The arrangement of these divisions may be varied, so as to suit the different parts of gas apparatus for which they are required.

The wood-cuts show some of the arrangements:—

Fig. 1 shows the Valve prepared for two purifiers, in which, by turning the upper cylinder, Fig. 2, the Gas is directed to either purifier separately.

Fig. 3 represents an arrangement for four purifiers, in which, by turning the upper cylinder, Fig. 4, the Gas is directed through three purifiers, and either one in rotation left out for cleaning.

A slight variation of the last arrangement adapts the Valve to three purifiers, passing the Gas through two of them, and having each one in rotation out of use.

Another arrangement is just completed for two purifiers, by which the Gas may be directed through both purifiers together, entering either first, or through either purifier separately. The advantages of this arrangement will be too manifest to Gas Manufacturers to need comment.

Fig. 5 represents the Valve arranged for a bye-pass, in which, by turning the upper cylinder, Fig. 6, the Gas is directed either through the bye-pass, or through the vessel to which it is attached.

The Valves are manufactured by the Patentees at their

IRON WORKS, FROME SELWOOD.

The following Testimonial has been received from an eminent Engineer:—

Fig. 6.

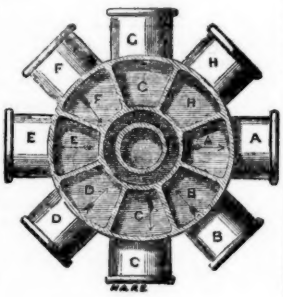


Fig. 3.

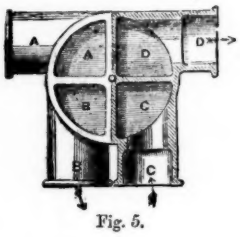


Fig. 5.

Gaslight and Coke Company's Office, Cheltenham, Jan. 17, 1859.

Messrs. Cockey and Sons, Frome.

Gentlemen,—The Patent Purifier Centre Valve which I had fixed instead of the common hydraulic valve for one of our sets of purifiers with 9-inch connexions, I am happy to say continues to afford satisfaction both to myself and to the workmen who have the charge of it.

I am, Gentlemen, yours truly, W. ESSON.

EDWARD COCKEY AND SONS

ALSO MANUFACTURE

PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,

HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M. B. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

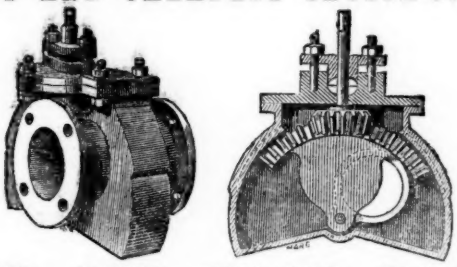
Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS GAS RETORTS &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King.
Originally J. Pidcock, Esq.

JOHN BENT, Manufacturer of
GAS-METERS,
283, BELL BARN ROAD, BIRMINGHAM,
(Established 1830),

Begs respectfully to call the attention of Gas Companies, Engineers, &c., to his WET GAS METER, made upon the most improved principles, the most admirable materials, and warranted to register correctly.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C., Where a Sample may be seen.

"ALL DOUBTS REMOVED."

DEFRIES' celebrated Dry Gas-METERS, of which there are 80,000 in use in Palaces, Churches, Chapels, Royal Dock-yards, Club Houses, Public Offices, and other buildings throughout the Empire, the Continent, and Colonies.

His meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that building was destroyed by fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company and found inflexibly correct.

On the 9th of June, 1858, at the Western Gas Company, his meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests, from the full lighting down to a single jet, and in each case, as in numerous other instances, accuracy was finely indicated.

His two large meters at the Thames Tunnel have been in constant use day and night for upwards of twelve years (one continuation of dark hours), subjected to the wear and tear of 75 years, as compared with the ordinary hours of using gaslight above ground.

Gas Companies honouring Mr. Defries with their commands for his PATENT DRY METER, which has done so much service in simplifying the fitting up of gas, as well as checking surreptitious burning, will be guaranteed perfection for five years free of charge.

Defries' Prize-Medal Gas Baths, Gas-Cooking and Heating Stoves. The Polytechnic Gas Fire, with indestructible fuel, in daily operation (Saturday excepted) at the Office, 406, Euston Road, Fitzroy Square, LONDON.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

London Agents: CHADWICK and AKEROYD, Willington Stone Wharf, Regent's Park Basin.

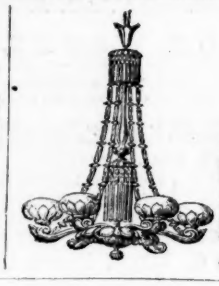
A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

ALEXANDER WRIGHT,

GAS ENGINEER, MANUFACTURER OF GAS-METERS, GOVERNORS, AND EVERY DESCRIPTION OF GAS APPARATUS,
55, MILLBANK STREET, WESTMINSTER.
CONSUMERS' METERS at the List Price, with a Liberal Discount to Wholesale Purchasers.
THOMPSON'S BROMINE TEST, £1. 1s.—BROMINE, 3s. per Ounce.
BISULPHURET OF CARBON TEST, £2. 2s.
APPARATUS FOR DETERMINING THE HEATING POWER OF SAMPLES OF COAL AND OTHER DESCRIPTIONS OF FUEL, £5. 5s.,
INVENTED BY LEWIS THOMPSON, Esq., M.R.C.S.
REGISTERING PRESSURE GAUGE, Net Price, £8. Glass Shade, 10s. extra.
STATION METERS, PRESSURE GAUGES, PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, &c.

JAMES OAKES and CO.,
ALFRETON IRON WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20, WHARF ROAD,
CITY ROAD, LONDON,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.
N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.
CHARLES HORSLEY, Agent.
C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

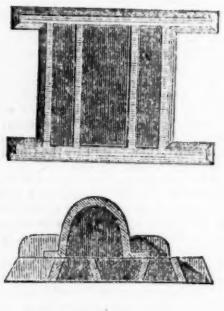


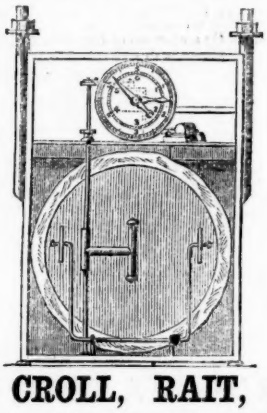
F. & C. OSLER,

44, OXFORD STREET, LONDON;
Manufactory—Broad Street, Birmingham—Established 1807,
MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.
ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards
(Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.
THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

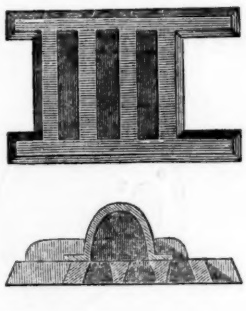
CROLL'S
PATENT IMPROVED DRY GAS-METER,

NEW VALVE.





OLD VALVE.



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FACTORY—Canal Bridge, Kingsland Road, N.E.

Messrs. CROLL, RAIT, and Co. beg to draw the attention of Gas Companies to the Removal of their Manufacturing Business from Blundell Street to the Kingsland Road, where they request that orders for Meters, or returned packages, may be sent.

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Mr. Croll is the Sole Proprietor of Patent Rights for this Meter in America, and Mr. John O'Neil, of Boston, U. S., is the Firm's Agent.

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